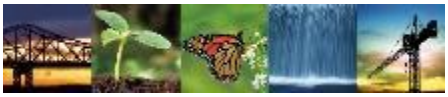


Known for excellence.
Built on trust.

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

GZA GeoEnvironmental of New York
104 West 29th Street
10th Floor
New York, NY 10001
T: 212.594.8140
F: 212.279.8180
www.gza.com

Via electronic mail

April 15, 2019
File No. 12.0076252.10

Jessica LaClair
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7013

Re: Sub-slab Depressurization System Pilot Test Work Plan – Sloop Brewery
Former IBM East Fishkill Facility, Hopewell Junction, NY
NYSDEC Site No. 314054, EPA ID NYD000707901

Dear Ms. LaClair,

GZA GeoEnvironmental of New York (GZA) has prepared this Sub-slab Depressurization (SSD) System Pilot Test Work Plan (PTWP) for the Sloop Brewery portion of Building 330C of the Former IBM East Fishkill Facility in Hopewell Junction, NY (Site). The Site is currently owned by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park). i.park is proposing a change of use from industrial to commercial for the Site. Previously completed sub-slab vapor and indoor air testing indicated the need for an active sub-slab depressurization system (SSDS) to mitigate vapors beneath the base slab, which is considered necessary regardless of the proposed change of use for the Sloop Brewery area. This work plan discusses the steps proposed to obtain design parameters for a permanent SSD system in the Sloop Brewery area.

If you have any questions regarding the above, please contact Meredith Hayes at 973.774.3332 or meredith.hayes@gza.com, or David Winslow at 973.774.3307 or david.winslow@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Meredith Hayes
Senior Project Manager

Ernest Hanna, P.E.
Consultant/Reviewer

David Winslow, P.G., Ph.D.
Senior Vice President

Known for excellence.
Built on trust.

SUB-SLAB DEPRESSURIZATION SYSTEM PILOT TEST WORK PLAN – SLOOP BREWERY

Former IBM East Fishkill Facility
2070 Route 52
Hopewell Junction, NY
NYSDEC Site No. 314054
EPA ID No. NYD000707901

April 15, 2019
File No. 12.0076252.10

PREPARED FOR:
i.Park84, LLC
485 West Putnam Avenue
Greenwich, CT 06830

GZA GeoEnvironmental of New York
104 West 29th Street, 10th Floor | New York, NY, 10001
212-594-8140

31 Offices Nationwide
www.gza.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 BACKGROUND INFORMATION 1

3.0 ENVIRONMENTAL SETTING 2

3.1 SOIL AND BEDROCK CONDITIONS 2

3.2 GROUNDWATER CONDITIONS 2

4.0 PREVIOUS INVESTIGATIONS 3

4.1 BUILDING 330C 3

5.0 SSD PILOT TEST STUDY 4

5.1 SUB-SLAB VAPOR EXTRACTION AND VAPOR ASSESSMENT POINT INSTALLATION 5

5.2 SSD PILOT TESTING EQUIPMENT 5

5.3 SAMPLING PROCEDURES 5

5.4 SSD SYSTEM PILOT TESTING PROCEDURES 6

6.0 INVESTIGATION SUPPORT ACTIVITIES 8

6.1 UTLITY CLEARANCE 8

6.2 QUALITY ASSURANCE/QUALITY CONTROL PROJECT PLAN (QAPP) 8

6.3 HEALTH AND SAFETY 8

6.4 COMMUNITY AIR MONITORING PLAN (CAMP) 8

7.0 REPORTING 9

8.0 SCHEDULE 9

9.0 REFERENCES 9

TABLE OF CONTENTS

TABLES

TABLE 1	BUILDING NUMBER CONVERSIONS LIST
TABLE 2	SYSTEM START UP AND COMMISSIONING CHECKLIST – SHAKEDOWN TEST
TABLE 3	INDUCED VACUUM DATA SHEET
TABLE 4	SYSTEM LOG SHEET

FIGURES

FIGURE 1	SITE LOCATION PLAN
FIGURE 2	SITE PLAN
FIGURE 3	PROPOSED SSDS PILOT TEST PLAN
FIGURE 4	DETAIL SHEET

APPENDICES

APPENDIX A	BLOWER SPECIFICATIONS
APPENDIX B	QUALITY ASSURANCE/ QUALITY CONROL PROJECT PLAN (QAPP)
APPENDIX C	HEALTH AND SAFETY PLAN (HASP)

1.0 INTRODUCTION

GZA GeoEnvironmental of New York (GZA) prepared this sub-slab depressurization (SSD) system, pilot test work plan (PTWP) on behalf of i.park84, LLC to detail our procedures to obtain the data needed to develop design parameters for a full-scale SSD system at the Sloop Brewery area of Building 330C (Sloop) of the Former IBM East Fishkill Facility (Facility) located at 2070 Route 52, Hopewell Junction, NY (Site). A portion of the Facility is currently owned by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park). The entire Former IBM East Fishkill facility is currently zoned for industrial use under its RCRA Part 373 Permit entered into by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park) and GLOBAL FOUNDARIES US 2 LLC (Global), an owner of other portions of the Former IBM East Fishkill facility, and International Business Machines Corporation (IBM), the former owner and operator of the Former IBM East Fishkill facility. i.park is proposing a change of use from industrial to commercial for the Site area defined for this work plan and surrounding areas. The objective of this PTWP is to collect sufficient data to design a full-scale SSD system in the Sloop Brewery. IBM maintains responsibility for addressing soil/sub-slab vapor and indoor air at the Facility except in portions where i.park has proposed a change in use from industrial to commercial, which includes the Sloop Brewery located within Building 330C. The on-Site groundwater contains chlorinated volatile organic compounds (cVOCs) and is currently being treated by IBM via pump and treat processes, with production wells located throughout the Facility. IBM has conducted soil/sub-slab vapor and indoor air quality assessments throughout the Facility, including in the Sloop Brewery portion of Building 330C.

2.0 BACKGROUND INFORMATION

The Former IBM East Fishkill Facility (Facility) comprises about 500 acres; including 2.7 million square feet of building space, associated asphalt parking lots and landscaped areas. The Facility is bounded to the south by Interstate Route 84, to the north by Route 52, to the east by a wooded region and John Jay Senior High School and to the west by another wooded region and Lime Kiln Road. The Facility was formerly owned and operated by IBM, beginning in 1962, for development and manufacturing of semiconductors, semiconductor packaging and electronic computing equipment. Beginning in 1993, portions of the Facility were leased to a number of independent entities for research, operations including manufacture of semiconductors and flat panel displays, and semiconductor equipment cleaning. IBM sold the Facility in July 2015 to Global. Global sold parts of the facility to i.park on 2017. At the time of the sale, the Facility was divided into lots 1-8, with lots 1 and 5 retained by Global. Facility building numbers were changed at the time of the sale at the request of the Hopewell Junction Township. All references to building numbers in this work plan reflect the historical building numbers; however, the conversion table (**Table 1)** is provided for on-Site reference, as the exteriors of the Facility buildings have been updated with the new building numbers. **Figure 1** depicts the location of the Former IBM East Fishkill Facility. Building 330C is present within the northeastern portion of the Facility. **Figure 2** depicts the Sloop Brewery area within Building 330C.

CVOCs are present in the subsurface at seven areas of concern (AOCs) at the Facility, which are subject to corrective action under the Part 373 Permit for the Facility (IBM 2011). These AOCs are where solvents have been released to the subsurface and includes Building 330C. Based on the prior use and underlying groundwater containing cVOCs, Building 330C was designated for confirmatory indoor air sampling under IBM's RCRA Facility Investigation (RFI) Work Plan dated June 15, 2009 (Sanborn 2009), which was approved by the NYSDEC and NYSDOH (agencies).

The operations at the Former IBM East Fishkill Facility must comply with terms and conditions set forth in the 6 NYCRR Part 373 Hazardous Waste Management Permit (IBM 2011), signed by IBM, Global and i.park. The entire Facility is

currently zoned for industrial use under the permit. The Final Statement of Basis (NYSDEC 2013) for the Facility details the final selected corrective measures for the Facility, which include continued operation of the groundwater extraction and treatment system installed as an interim corrective measure, institutional controls, engineering controls, and site management. The Final Statement of Basis (NYSDEC 2013) indicates Facility-wide soil/sub-slab vapor and indoor air investigation to be implemented by IBM.

Building 330C was historically used by IBM for manufacturing of computer chips. The ground floor of Building 330C housed several laboratories, offices, storage space, and manufacturing areas. Solvents were historically stored and used in parts of Building 330C. Solvent lines and lift stations were historically present throughout the building. Several solid waste management units (SWMU) accumulation areas were historically located in and around Building 330C. Building 330C was a center of bulk tetrachloroethene (PCE) usage prior to phasing out PCE from manufacturing operations in the late 1990s.

Building 330C is currently occupied by multiple lessees, including Sloop Brewery. The Sloop Brewery area consists of a brewing area, tasting room and event space, located in the northeastern portion of Building 330C. The Sloop Brewery area occupies an area of approximately 26,400 square feet. There is no basement within the Sloop Brewery area. The building construction consists of concrete block walls and slab on grade.

3.0 ENVIRONMENTAL SETTING

3.1 SOIL AND BEDROCK CONDITIONS

The geology of the area is typified by folded and faulted Paleozoic sedimentary rocks overlain by unconsolidated glacial deposits and more recent alluvial deposits. Locally, the bedrock consists of Ordovician dolomite interbedded with smaller amounts of limestone, sandstone, siltstone and shale.

3.2 GROUNDWATER CONDITIONS

Groundwater flow in the unconsolidated material is typically governed by surface topography, hydraulic conductivity, the presence or absence of an aquitard, proximity to areas of recharge and vertical gradients induced by the Facility's production wells. Depths to overburden groundwater varies from 30 feet in the central part of the Facility to 10 feet on the eastern portions of the Facility. Water table elevations are highest in the spring and lowest in the fall, and long-term records indicate a direct relationship between water table elevation and rainfall. Recharge of surface water into the upper aquifer is variable due to the extensive development at the Facility.

The general direction of bedrock groundwater flow across the Facility was northward before the IBM production wells were put into production. Measurements show pronounced influence of the production wells causing a downward vertical gradient and the direction of the bedrock groundwater flow under much of the Facility to be onto the Facility towards the pumped wells. Current groundwater flow on Site is expected to be to the west-southwest, towards one of the on-Site production wells, based on recent well gauging events (IBM 2014). Current water levels at the Facility in the bedrock range from flowing artesian conditions to depths of greater than 150 feet below ground surface (bgs).

4.0 PREVIOUS INVESTIGATIONS

4.1 BUILDING 330C

Building 330C was designated in the RFI Work Plan for indoor air assessment for certain VOCs. The first round of confirmatory indoor air samples was collected in Building 330C by IBM in August 2009, in accordance with the 2009 RFI Work Plan (Sanborn 2009), which consisted of a series of 8-hour time-weighted-average SUMMA® canister samples. No sub-slab vapor samples were collected during this event. The results of the August 2009 indoor air sampling event were provided to the agencies in a November 2009 report (IBM 2009). Results identified the anomalous presence of VOCs, including PCE, trichloroethene (TCE), vinyl chloride, Freon 113, benzene, and m,p-xylenes in Building 330C. The highest concentrations were generally observed in the southwest portion of Building 330C. VOCs were detected in the Sloop Brewery area footprint, including Freon-11 (4.2 µg/L) and Freon-12 (2.3 µg/L). PCE and TCE were not detected above laboratory reporting limits in the Sloop Brewery area footprint during the 2009 indoor air sampling event.

Based on these results, IBM conducted focused sampling in the southwest quadrant of Building 330C and identified the potential sources of VOCs in the indoor air. IBM implemented interim remedial measures including sealing of piping penetrations and modifying heating, ventilation and air conditioning (HVAC) settings in the southwest quadrant of Building 330C. IBM proposed further work to assess and lower the concentrations of VOCs detected in the Building 330C indoor air, including modifications to three floor-mounted air cooling/recirculation units, closure/sealing of an industrial pit, several trenches, expansion joints, and sealing of peeling floor tiles. This work was carried out by IBM between 2010 and 2013 and was documented in a July 2014 Report to the agencies (IBM 2014).

In August 2015, Global requested to change HVAC operations in Building 330C due to decreased occupancy in portions of the building. Indoor air quality (IAQ) screening and sampling was subsequently conducted in November 2015 to assess VOC concentrations under the HVAC system operating conditions requested by Global. IAQ sampling was conducted by using a HAPSITE® portable gas chromatograph/mass spectrometer (GC/MS) followed by confirmatory indoor air samples using 8-hour time-weighted-average SUMMA® canister samples. IAQ screening and confirmatory sampling was conducted under the adjusted operating conditions requested by Global. Results of this GC/MS testing indicated TCE concentrations between 0.60 and 3.2 µg/m^3. PCE concentrations were at or below 30 µg/m^3 at 45 of the 48 screening locations. Unoccupied areas exhibited PCE concentrations of 66, 120 and 600 µg/m^3. Screening conducted within the present Sloop Brewery area exhibited PCE concentrations ranging from and 1.7 to 12 µg/m^3. TCE was not detected above the equipment detection limit within the present Sloop Brewery area. Confirmatory indoor air samples in the building exhibited PCE and TCE concentrations ranging from non-detect (ND) to 15 µg/m^3 and ND to 0.32 µg/m^3, respectively. Confirmatory indoor air samples in the Sloop Brewery area did not detect PCE or TCE above the laboratory detection limits. The proposed changes to the HVAC settings were made upon completion of this testing. IBM and Global agreed to re-evaluate HVAC settings if changes in occupancy were planned in the future. This information is documented in a February 2016 report, submitted to the agencies (IBM 2016a).

IBM elected to conduct SSD system pilot testing at Building 330C in 2015 and 2016 to evaluate its potential effectiveness in controlling air pressure gradients across the floor slab in certain areas with higher potential for vapor intrusion. Based on the results of the SSD system pilot testing, conducted by Sanborn, Head Engineering P.C. (Sanborn) in April 2015, IBM elected to install a temporary SSD system as an interim measure in the northwest portion of Building 330C where the highest PCE concentrations were observed. The interim SSD system consisted of a single suction pit in the northwest portion of Building 330C. IAQ sampling and screening were conducted after the interim SSD system was brought online, the results of which were presented in a July 2016 report (IBM 2016b) that was submitted to the agencies. As discussed in the July 2016 report, the interim SSD system was found to be successful in reducing VOC vapor intrusion in the

northwest portion of the building. It should be noted that the interim SSD system did not extend to the Sloop Brewery area.

Further SSD pilot testing was conducted in 2016 by Sanborn to develop a conceptual full-scale SSD system design for Building 330C (IBM 2017a). Sub-slab vapor samples were collected across Building 330C during this event. PCE concentrations in the sub-slab ranged from 54 to 870,000 µg/m^3, with the highest concentrations observed in the northwest and southwest quadrants of the building. PCE concentrations in the sub-slab vapor ranged from 3,200 to 32,000 µg/m^3 in the Sloop Brewery area. A design basis for the permanent SSD system was established based on the pilot test results and included achieving SSD in areas where PCE levels in sub-slab vapor exceeded 50,000 µg/m^3 and focused on areas where PCE levels in indoor air were historically the more higher concentrations within Building 330C. The agencies approved the March 2017 conceptual SSD system design for Building 330C in a letter to IBM dated August 23, 2017 but the approval was contingent on Global's plans for occupancy in Building 330C.

Additional IAQ testing was conducted in 2017 and results were presented in a May 2017 report submitted to the agencies (IBM 2017b). Based on the data presented in the report, the agencies requested additional actions to address potential exposures in all occupied spaces within Building 330C. On June 13, 2018 IBM, Global, and i.park met with NYSDEC and NYSDOH to discuss the proposed change in occupancy of Building 330C. The agencies requested additional preliminary indoor air sampling be conducted for the spaces to be occupied prior to the installation of the permanent SSD system and that additional indoor air sampling of spaces within Building 330C should be conducted if there are structural changes to the building or changes to the HVAC system settings.

In November 2018, Walden Environmental Engineering (Walden), on behalf of i.park, conducted IAQ screening in the Sloop Brewery area. As part of the assessment, Walden collected both indoor air and sub-slab vapor samples. The results, documented in a January 2019 report (Walden 2019), indicated VOC concentrations in the sub-slab vapor and indoor air, most notably PCE and TCE, at levels requiring mitigation based on NYSDOH guidance documents. Carbon tetrachloride was also detected in indoor air at concentrations exceeding ambient air values. However, concentrations of carbon tetrachloride in the sub-slab vapor samples were lower than indoor air concentrations, indicating a potential indoor air source of carbon tetrachloride. The NYSDEC reviewed the January 2019 report and requested the installation of a SSD system beneath the slab of the Sloop Brewery area in a letter to Walden dated February 1, 2019. GZA prepared this work plan to conduct a pilot study to design an SSD system for the Sloop Brewery area. This SSD system will be designed to depressurize the entire footprint of the Sloop Brewery area and will be operated separately and not combined with the building-wide SSD system.

5.0 SSD PILOT TEST STUDY

The SSD system pilot study will be conducted at two sub-slab extraction points to: 1) evaluate the effectiveness of SSD in controlling air pressure gradients across the floor slab as a means of reducing the potential for vapor intrusion; and 2) obtain observational data that can be used to support design of a SSD system. A sub-slab vapor assessment will be conducted at a series of sub-slab vapor monitoring points to: 1) evaluate the presence and extent of VOCs below the floor slab; and 2) establish a sub-slab vapor testing and monitoring network to support potential SSD as a measure to control air pressure gradients across the floor slab. GZA will perform an SSD system pilot test in the Sloop Brewery area over a one to two-day period to determine the design parameters for the final SSD system. This section provides a summary of the planned testing procedures and analysis.

5.1 SUB-SLAB VAPOR EXTRACTION AND VAPOR ASSESSMENT POINT INSTALLATION

A sub-slab vapor extraction point and a series of vapor assessment points were installed in the Sloop Brewery area by IBM during a previous SSD system pilot test in Building 330C. GZA will inspect the Sloop Brewery area prior to Site activities to examine the conditions and accessibility to the existing sub-slab vapor extraction point (EP3004) and vapor monitoring points (SS3024 through SS3026, SS3047 and SS3049). Current and proposed sus-slab vapor extraction and vapor assessment points are shown in **Figure 3**.

GZA will install an additional two-inch sub-slab vapor extraction point (VEP-1) within the Sloop Brewery area to confirm the heterogeneity of the material underneath the slab. The VEP-1 will be constructed by coring a 3-inch diameter hole through the concrete floor slab and installing a two-inch-diameter by approximately 1.5-ft-long 20-slot schedule 40 PVC screen equipped with a capped port flush with the floor. The sub-slab vapor extraction point will extend approximately 12-inches below the slab. Installation details for the extraction point is shown on **Figure 4**.

Four sub-slab vapor assessment points (VP-1 through VP-4) will be installed at varying distances (5, 10, 15, and 20 +/- feet) from the proposed VEP-1 location. These points will be constructed by coring the concrete floor slab and installing a 0.5-inch diameter by approximately 3.5-inch long Vapor Pin®. The vapor pin is self-sealing and it will be equipped with a capped port flush with the floor to obtain an air-tight seal. The hole through the concrete will extend approximately three-inches below the slab and annular space around the vapor pin will be sealed with silicone. A schematic of a sub-slab vapor assessment point is shown on **Figure 4**.

5.2 SSD PILOT TESTING EQUIPMENT

A portable regenerative blower (Type R4110N-50 blower, or similar) with a maximum capacity of generating 35 inches of water (IW) vacuum and an air flow rate of 74 cubic feet per minute (CFM) will be temporarily mobilized to the Site. **Appendix A** provides the specifications of the blower. The blower will be connected to the extraction point by a two-inch diameter Schedule 40 PVC pipe, which will be equipped with ports to measure flow velocity and vacuum, and a sampling port to collect sub-slab vapor samples. Ball valves will also be installed to allow GZA to throttle the flow and vacuum. **Figure 4** provides connection details to the sub-slab vapor extraction point. A bead of putty, VOC free clay or bentonite will be applied around the perimeter of the two-inch pipe fittings to ensure a tight connection. A TSI Velocity calc 9515 or similar will be used to measure air velocity and temperature. Induced and applied vacuum readings will be collected from the sub-slab vapor monitoring and extraction points using calibrated magnehelic gauges and appropriate piping adaptors. GZA will be equipped with the following magnehelic gauges 0 – 0.25 IW; 0 – 1 IW; 0 – 10 IW; 0 – 20 IW and 0 – 100 IW.

5.3 SAMPLING PROCEDURES

The extraction point will be connected to the blower using PVC pipe and rubber couplings, the seam where the PVC pipe meets the concrete slab will be sealed with bentonite, VOC free clay or putty. An air sample will be collected from the extraction point through a sampling port (from the vacuum side) for the VOC analysis using U.S. Environmental Protection Agency (EPA) method TO+15.

Helium integrity testing will be performed on the sub-slab vapor assessment points following installation to confirm air tight seals around the slab penetration. Helium integrity testing will involve placing a plastic shroud over the newly installed point and sealing all penetrations with hydrated bentonite or putty. New Teflon sample tubing will be connected to the sample point which will run out through the plastic shroud and connect to a 0.5-liter Tedlar© bag via a peristaltic or Gillian air sampling pump. The sub-slab gas sampler will purge approximately one to three sampler volumes (0.4 L) by

activating the pump to fill the Tedlar© bag to near capacity. During purging, a flow of helium gas will be introduced into the plastic shroud overlying the sub-slab vapor sampling point. The Tedlar© bag will be analyzed in the field using a Marks Model 9822 helium detector to check for short circuiting of outside air into the sampling port. If helium is detected at a concentration of greater than 10 percent, the sub-slab gas point will be resealed with hydrated bentonite. The point will then be retested to ensure that the helium gas concentration is less than 10 percent. **Figure 4** provides details of the helium leak detection set up.

When sub-slab vapor/indoor air/ambient air samples are collected, the following conditions that have the potential to influence the interpretation of results will be documented:

- Identification of any products present within the building space, that could influence the indoor air sample results will be recorded;
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Other pertinent observations, such as odors or readings from field instrumentation.

5.4 SSD SYSTEM PILOT TESTING PROCEDURES

GZA will use a combination of the existing and proposed sub-slab vapor assessment or monitoring points to determine the sub-slab vacuum response to vapor extraction testing at different flow rates and vacuum settings. The active SSD system performance goal is to achieve, at a minimum, a uniform vacuum of negative 0.004 inches of water (IW) beneath the floor slab of the Site as measured by the monitoring points. Sub-slab resistance will be measured by recording the reading of the vacuum blower (0 to 35 IW column) through the pressure port connection at the vapor extraction point. The information obtained from this testing will be used to determine the radius of influence (ROI) and sub-slab resistance to size the blower for design. The pilot test will include a shakedown test and phase test conducted in two phases.

5.4.1 Shakedown Test

An initial shakedown test will be conducted to get familiar with the system capacity and controls. The initial shakedown test will be conducted at low and maximum sustainable applied vacuum, and the checklist included in **Table 2** will be followed. With the inlet to the blower connected to the 2-inch rubber coupling and the 1.5 -inch ball valve directing the dilution air will be completely closed as part of the shakedown test, the full negative pressure of the blower will be applied to the sub-slab. The ball valve will then be fully opened as part of the shakedown test, resulting in no vacuum being applied to the sub-slab. The precise vacuum will be determined by connecting a magnehelic gauge to the pressure port barbed fitting.

5.4.2 Phase Test

The pilot test will be conducted in two phases, with each phase having a specific goal. The details on the phase test and goals are listed below:

Phase Test	Goals
Phase I: Step Test at Extraction Points EP004 and VEP-1	Develop vacuum vs. distance relationship and identify an optimal flow rate at EP3004 and VEP-1
Phase II: SSD Long-Term Test	Estimate vapor loading at an optimal flow rate determined during Phase I

After the initial shakedown test is completed, the Phase I/step test will be conducted over a series of vacuum and flow settings. For the first phase of the pilot test, vacuum will be applied at EP004 and VEP-1 and will be operated at three different air flow settings ranging between 10 and 74 CFM. The three different flow/vacuum setting tests are referred to as a step-test. Each step of the test will be performed for approximately one hour, to allow for induced vacuum to equalize in the subsurface. These tests will be used to evaluate the relationship of air vacuum vs. distance relationship and identify an optimal flow rate. During this process induced vacuum measurements will be collected. The procedures for each individual phase of the pilot test is provided below.

Phase I: Step Test

- Set the vacuum blower at the lowest flowrate and then start the first step test.
- Induced vacuum readings are taken by temporarily connecting the magnehelic gauge to the sub-slab vapor monitoring points. During this test, all points should have vacuum readings. Positive readings (pressure) may be observed and should be clearly labeled on the data sheet with a plus sign (+). Induced vacuum readings will be taken every 15 minutes until the end of the test
- Apply vacuum at increased IW in a stepped manner, air flow at the extraction point will be recorded and checked every 10 minutes (see **Table 3**) until the end the test.
- Sub-slab vapor monitoring points will be sealed between readings.
- The extraction point will be screened with a PID and record it (PID measurement) on **Table 3**.
- When readings have stabilized, and/or the test has been run for at least 60 minutes, that step of the test will be terminated.
- The same procedure will be repeated for all three flow rate steps and it will be increased to the next level starting with the lowest flow rate (i.e. ~10 CFM). A separate data sheet will be used to document the monitoring for each step.
- One round of perimeter air quality monitoring will be performed using a PID, (at background and test area locations) at the beginning and end of each step. The observed values will be recorded in a field book.

Phase II long term test will be conducted at a fixed optimal flow and vacuum settings obtained from Phase I testing over a longer duration (~2 to 3 hours). The details for the Phase II test is discussed step-wise below.

Phase II: Long Term SSD Test

- The Phase II Long Term SSD test will be run for 2 to 3 hours.
- Test will be run at the optimal sustainable/allowable flow rate setting obtained from Phase I.
- Induced vacuum readings will be obtained every 15 minutes for the first 60 minutes, and then every 30 minutes after stabilization throughout the test and recorded in **Table 4**.
- PID readings will be taken every 30 minutes to one (1) hour. Applied vacuum and flowrate will be constantly monitored during this test and will be recorded at the beginning of the test and checked every 30 minutes. Any changes will be noted and recorded.
- Prior to shutdown of the system; one sub-slab sample will be collected from the EP3004 or VEP-1 through the air sampling port on the vacuum side. The sample will be collected over a 30-minute period, using a regulator calibrated for a 30-minute collection time. In addition, one duplicate sample will be collected from the extraction point. Samples will be submitted to a New York State certified laboratory for VOC analysis using the EPA method TO+15.

- One indoor air sample and two ambient outdoor air samples (one each in the upwind and downwind directions) will be collected to confirm the background levels. The samples will be collected over a 30-minute period, using a regulator calibrated for a 30-minute collection time. Samples will be submitted to a New York State certified laboratory for VOC analysis using the EPA method TO+15.

6.0 INVESTIGATION SUPPORT ACTIVITIES

6.1 UTLITY CLEARANCE

Prior to performing subsurface work, a utility clearance survey will be performed in accordance with New York Dig-Safe protocol. The proposed sub-slab vapor extraction and vapor monitoring point locations will be marked on a map and compared to the known utility locations and utility drawings. If the location is deemed acceptable by GZA and i.park, then the location will be screened using surface geophysical techniques such as electromagnetic (EM), ground penetrating radar (GPM) and radio frequency (RF) techniques prior to installation.

6.2 QUALITY ASSURANCE/QUALITY CONTROL PROJECT PLAN (QAPP)

During the pilot study sub-slab vapor, ambient air, indoor air samples and one duplicate air sample will be collected for VOC analysis using EPA method TO+15. Air samples will be analyzed at an environmental laboratory accreditation program (ELAP) certified laboratory. **Appendix B** provides details for quality assurance and quality control during pilot test activities.

6.3 HEALTH AND SAFETY

Field personnel will be outfitted in the appropriate health and safety equipment and be educated on Site-specific hazards as outlined in the Site-specific Health and Safety Plan (HASP) prepared for the sampling activities (**Appendix C)**.

6.4 COMMUNITY AIR MONITORING PLAN (CAMP)

Ground intrusive work will be conducted in accordance with the instructions provided by the agencies for conducting air monitoring during indoor work.

During GZA's initial Site visit, the on-Site representative will observe and note the location of exhaust vents and discharge points in the Sloop Brewery area, as well as vapor pathways (openings, conduits, etc.) relative to adjoining rooms. The on-Site representative will also note the activity in the Sloop Brewery area and identify the nearest potentially exposed individuals based on the location of the pilot test point installation locations.

Based on the observations during the Site visit, an exclusion zone will be set up prior to pilot test activities to maintain a minimum of 20 feet from exposed individuals (as per DER-10, Appendix 1A). Sub-slab vapor extraction and vapor monitoring point installations will be the only activities associated with this work plan where there is a potential for dust to be generated. The installations will be brief and will include the use of a negative-pressure enclosure equipped with a high efficiency particulate air (HEPA) filter to ensure no airborne dust is generated during drilling activities.

7.0 REPORTING

Based upon the design parameters obtained from the pilot study, GZA will prepare a conceptual SSD system design for the agencies review and approval. Comments from the agencies will be addressed in the 100% design document. The conceptual design will include proposed location and quantities of extraction points/sumps, details on the extraction wells, vapor monitoring points, vapor treatment system (based on sub-slab vapor sampling results), electrical, blower size and type, and piping details and routes. This design will be used to construct and implement the full-scale system.

8.0 SCHEDULE

A schedule for implementation of the work described in this work plan is provided below. The schedule will be initiated upon NYSDEC approval of this work plan. Updates to the schedule based on a change in Site conditions, subcontractor availability, or other factors will be communicated to NYSDEC. In general, the schedule indicates about 7 to 8-weeks from NYSDEC approval of this Plan to completion of a conceptual design.

Mobilization to Site	One week following NYSDEC approval of this work plan
Field activities	Three days
Laboratory analysis	Two weeks
Conceptual design to NYSDEC	Three weeks

9.0 REFERENCES

Division of Environmental Remediation, New York State Department of Environmental Conservation (NYSDEC), 2013. Final Statement of Basis – IBM East Fishkill Facility, East Fishkill Dutchess County.

IBM and Sanborn, Head Engineering, P.C., November 2009, Confirmatory Sampling Results, Buildings 330C and 338, VOC Source Assessment, Former IBM East Fishkill Facility, Hopewell Junction, NY.

International Business Machines Corporation (IBM), 2011. New York State Department of Environmental Conservation 6 NYCRR Hazardous Waste Management Permit Renewal Application.

IBM Environmental Engineering (IBM), 2013. Annual Corrective Action Status Report – IBM Corporation, Hopewell Junction NY.

IBM and Sanborn, Head Engineering, P.C., July 2014, Report of Supplemental Remedial Measures, Building 330C VOC Source Assessment, Former IBM East Fishkill Facility, Hopewell Junction, NY.

IBM and Sanborn, Head Engineering, P.C., February 2016 (2016a), Report of HVAC Adjustment and Indoor Air Quality Testing – Buildings 330C and 338, Former IBM East Fishkill Facility, Hopewell Junction, NY.

IBM and Sanborn, Head Engineering, P.C., July 2016 (2016b), Report of Interim Measures and Indoor Air Quality Testing, Building 330C, Former IBM East Fishkill Facility, Hopewell Junction, NY.

IBM and Sanborn, Head Engineering, P.C., March 2017 (2017a), Sub-slab Depressurization Conceptual Design Report, Building 330C, Former IBM East Fishkill, Hopewell Junction, NY.

IBM and Sanborn, Head Engineering, P.C., May 2017 (2017b), Report of Interim Measures and Indoor Air Quality Testing, Building 330C, Former IBM East Fishkill, Hopewell Junction, NY.

Tables

TABLE 1

BUILDING CONVERSIONS LIST

Sloop Brewery SSDS Pilot Test Workplan

2070 Route 52

Hopewell Junction, New York 12533

Old Building Number	New Building Number
310	220
320	200
320A	210
330D	700
330C	755
334	745
335	720
338	730

TABLE 2

SYSTEM START UP AND COMISSIONING CHECKLIST - SHAKEDOWN TEST

Sloop Brewery SSDS Pilot Test Workplan

2070 Route 52

Hopewell Junction, New York 12533

Date: _____

Person Performing Inspection: _____

Check	Description	Notes
	Inspect connections to the extraction well (EP004 or VEP-1)	
	Inspect valves are open to treatment wells	
	Inspect that other manifold legs are closed	
	Check the condition of the flow meter, vacuum guages and temperature probe	
	Check the condition of all of the valves, including dilution valve	
	Check the condition of the air filter	
	Check for fire estinguisher	
	Secure the area with cones or barricades	
	Ensure that all sample ports are closed	
	Ensure all vapor probes are capped (closed)	
	Record the time	
After turning on the blower:		
	Run blower and ensure there are no leaks in the above ground line(s)	
	Calibrate magnehelic gauges	
	Conduct SSD shakedown test as indicated in the workplan	
	Conduct SSD pilot test as indicated in the workplan	

TABLE 3
INDUCED VACUUM DATA SHEET
Sloop Brewery SSDS Pilot Test Workplan
2070 Route 52
Hopewell Junction, New York 12533

Project Name: ____________________
Project Number: ____________________
Date: ____________________
Weather: ____________________
Personnel: ____________________
Vapor Extraction Well(s): ____________________
Test Start Time: ____________ Test End Time ____________

Test Phase: ____________________
Applied Vacuum at Extraction Point: ____________________
Volumetric Flow Rate (Extraction Point): ____________________
Notes: ____________________

Time of Readings (min)	Elapsed Time (hr/min)	Observation Points							
		VP-1		VP-2		VP-3		VP-4 (If applicable)	
		VAC (in-H20)	PID (ppm)	VAC (in-H20)	PID (ppm)	VAC (in-H20)	PID (ppm)	VAC (in-H20)	PID (ppm)

Notes:
Vac: Vacuum (in-H20)
CFM: Cubic feet per minute

TABLE 4
SYSTEM LOG SHEET
Sloop Brewery SSDS Pilot Test Workplan
Hopewell Junction, New York 12533

Project Name: _____ Test: _____
Project Number: _____ Extraction Well ID: _____
Date: _____ Influent Temperature: _____
Weather: _____ Start Time _____
Personnel: _____ Stop Time: _____
Extraction Well ID: _____

Notes: _____

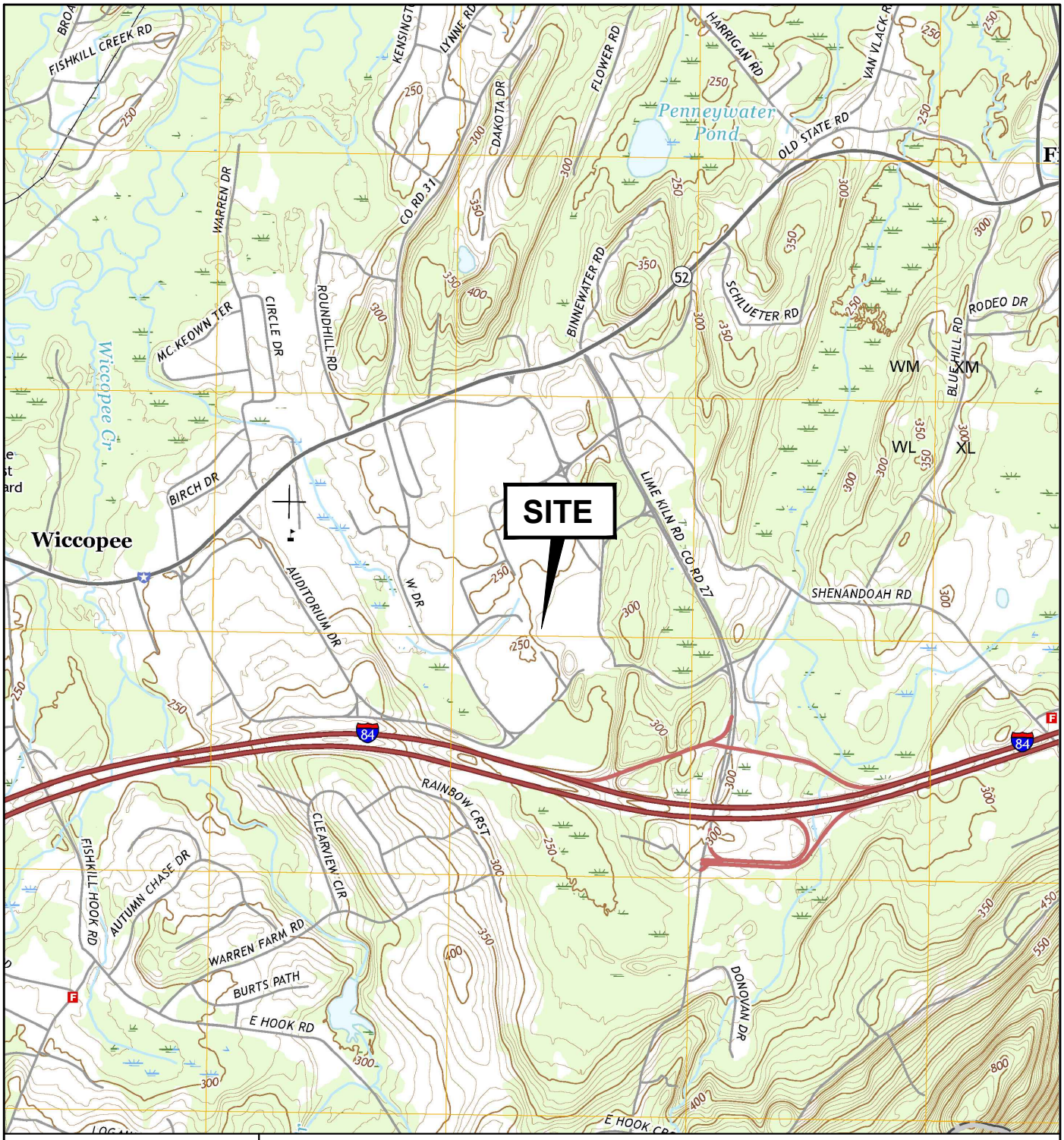
System:

Time	Elapsed Time (min)	Vac @ Extraction Point (in-H20)	Influent Temp (˚F)	Soil Vapor Flow Rate (CFM)	Influent PID (ppm)	SVE Blower Run Time

Notes:

Vac: Vacuum
in-H20: Inches of Water
F: Degree Farenheit
CFM Cubic Feet per Minute
ppm: Parts Per Million

Figures



NEW YORK

QUADRANGLE LOCATION

SOURCE:
USGS TOPOGRAPHIC MAP: HOPEWELL JUNCTION, NY (2016).
CONTOUR INTERVAL 10 FT., NAVD-1988, ORIGINAL
SCALE 1:24,000 (1" = 2,000 FT.).

N
W E
S

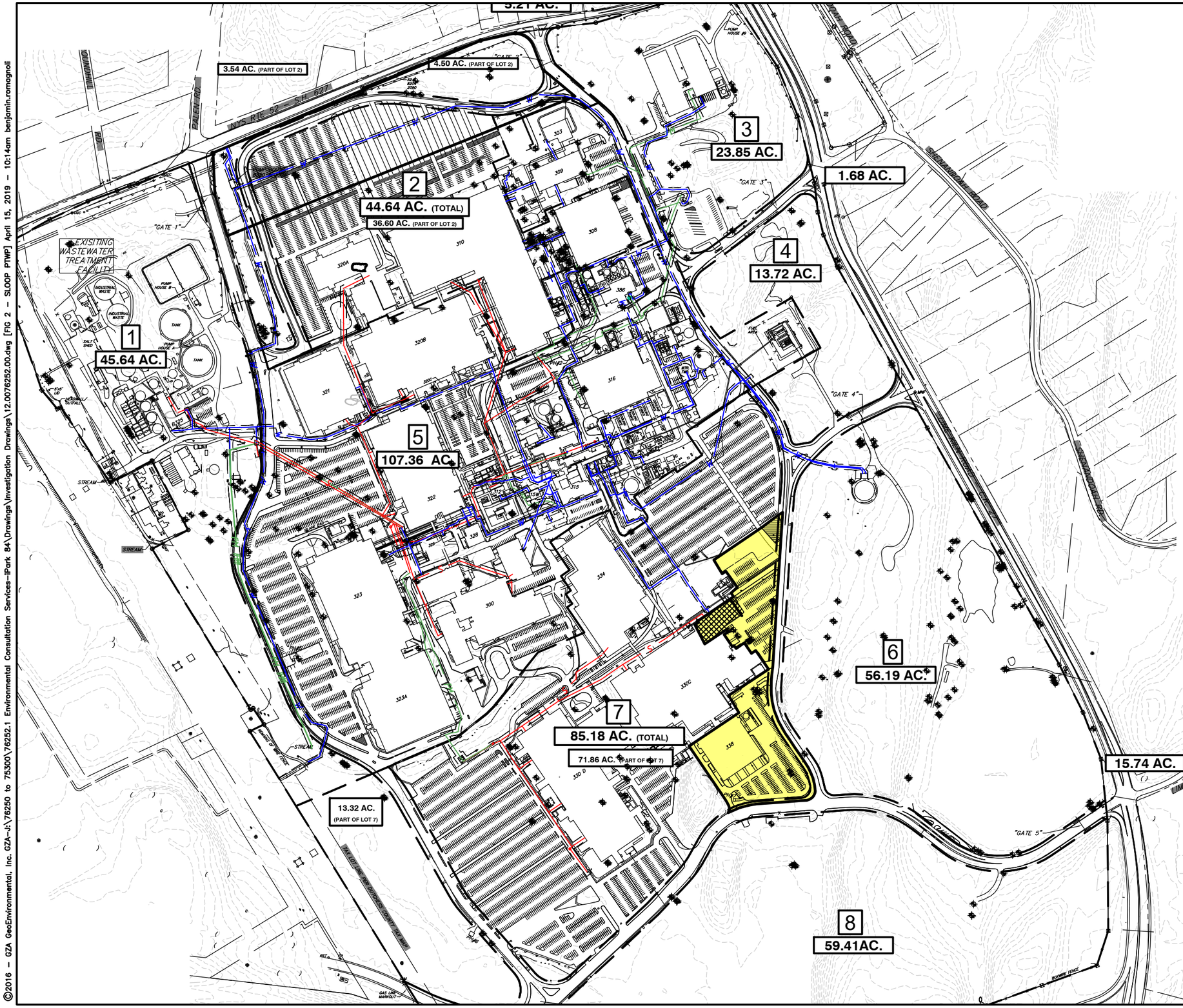
SSDS PILOT TEST WORKPLAN - SLOOP BREWERY

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
I.PARK84, LLC.
GREENWICH, CT

SITE LOCATION PLAN

PROJ MGR: BP	REVIEWED BY: DW	CHECKED BY: BR	FIGURE 1
DESIGNED BY: BR	DRAWN BY: PB	SCALE: 1" = 2,000'	
DATE: MARCH 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 1 OF 4



SOURCE:
SURVEY BASE MAP AND LOT LINES PROVIDED BY CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C. – FINAL SUBDIVISION PLAT EXISTING CONDITIONS, REVISION 13, 06/29/17

1
45.64 AC.
LOT IDENTIFICATION AND ACREAGE

LOT BOUNDARIES

UTILITY EASEMENT BOUNDARY

WATER UTILITY LINE

UNKNOWN UTILITY LINE

SANITARY SEWER LINE

MW-837 MONITORING WELL

AREA PROPOSED FOR COMMERCIAL USE

SLOOP BREWERY AREA (AREA TO BE DEPRESSURIZED)

0 250 500 1,000
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

SSDS PILOT TEST WORKPLAN - SLOOP BREWERY

SITE PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
I.PARK84, LLC.
GREENWICH, CT

PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: BR	FIGURE 2
DESIGNED BY: BR	DRAWN BY: PB	SCALE: 1" = 500'	
DATE: MARCH 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 2 OF 4

SOURCE:

1. SURVEY BASE MAP AND LOT LINES PROVIDED BY CHAZEN NGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C. – FINAL SUBDIVISION PLAT EXISTING CONDITIONS, REVISION 13, 06/29/17
2. THE LOCATIONS OF EXISTING SUB–SLAB VAPOR ASSESSMENT AND EXTRACTION POINTS WERE OBTAINED FROM SANBORN HEAD ENGINEERING, FIGURE 3, SUBSLAB PORT LOCATION AND PIPING PLAN, APRIL 2018

NOTE: AMBIENT AIR SAMPLES WILL BE COLLECTED FROM UPWIND AND DOWNWIND LOCATIONS

N

SS3026 — EXISTING SUB–SLAB VAPOR ASSESSMENT POINT

EP3004 — EXISTING SUB–SLAB VAPOR EXTRACTION POINT

VP-1 — PROPOSED SUB–SLAB VAPOR ASSESSMENT POINT

VEP-1 — PROPOSED SUB–SLAB VAPOR EXTRACTION POINT

SLOOP BREWERY AREA (AREA TO BE DEPRESSURIZED)

AREA PROPOSED FOR COMMERCIAL USE

0 25 50 100

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

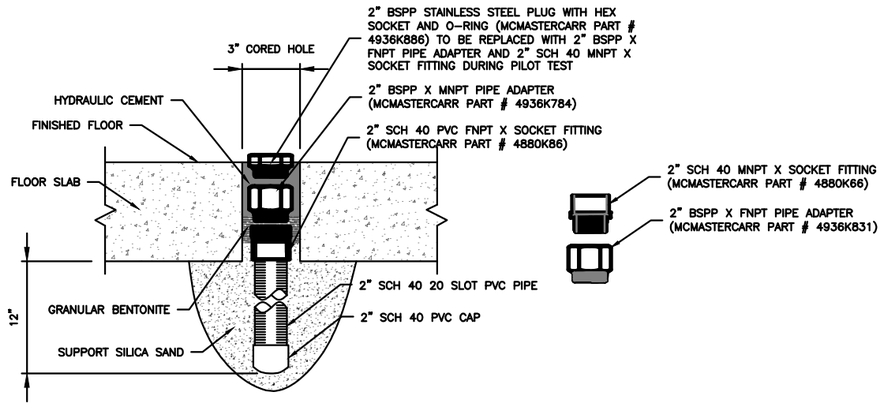
SSDS PILOT TEST WORKPLAN - SLOOP BREWERY

PROPOSED SSDS PILOT TEST PLAN

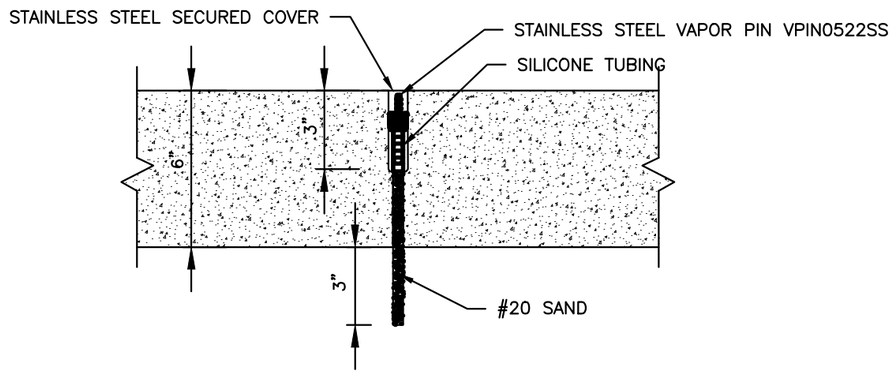
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
I.PARK84, LLC.
GREENWICH, CT

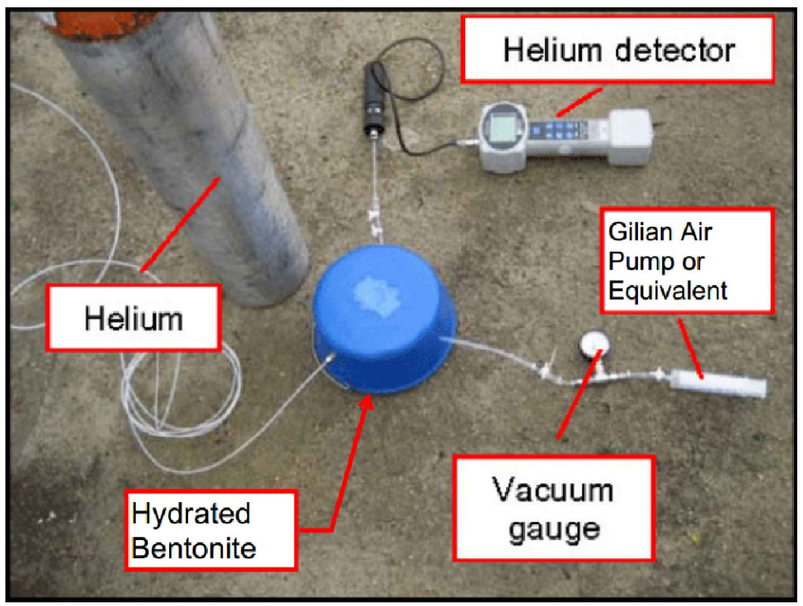
PROJ MGR: BP	REVIEWED BY: DW	CHECKED BY: BR	FIGURE 3
DESIGNED BY: BR	DRAWN BY: PB	SCALE: 1" = 500'	
DATE: APRIL 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 3 OF 4



DETAIL 1: SUBSLAB VAPOR EXTRACTION POINT



DETAIL 2: SUBSLAB VAPOR ASSESSMENT POINT



DETAIL 3: TYPICAL LEAK DETECTION SETUP

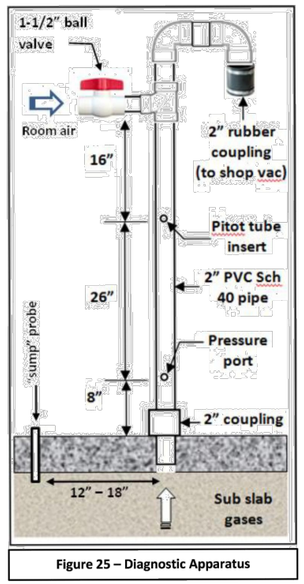


Figure 25 – Diagnostic Apparatus

DETAIL 4: TYPICAL PILOT TEST APPARATUS

N

NO.	ISSUE/DESCRIPTION	BY	DATE

SSDS PILOT TEST WORKPLAN - SLOOP BREWERY

DETAIL SHEET

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
I.PARK84, LLC.
GREENWICH, CT

PROJ MGR: BP	REVIEWED BY: DW	CHECKED BY: BR	FIGURE 4
DESIGNED BY: BR	DRAWN BY: PB	SCALE: NTS	
DATE: MARCH 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 4 OF 4

Appendix A

R3105N-50

R4 - R7 Series

R3-R7 Series - Explosion Proof Motors

MODELS	Maximum Pressure ("H_2O) 60 Hz	50 Hz	Maximum Vacuum ("H_2O) 60 Hz	50 Hz	Maximum Air Flow (CFM) 60 Hz	50 Hz
R3105N-50	43	31	40	28	53	44
R4110N-50 **R4310P-50**	51	38	48	35	92	74
R4P115N-50	65	45	60	40	133	112
R5125Q-50 **R5325R-50**	55 65	- 50	60 65	- 47	160 160	- 133
R6130Q-50 **R6340R-50**	60 100	75 75	70 80	65 65	215 215	180 180
R6P155Q-50 **R6P355R-50**	95 100	80 80	85 85	65 65	280 280	235 232
R7100R-50	100	90	110	85	425	350

PRODUCT FEATURES

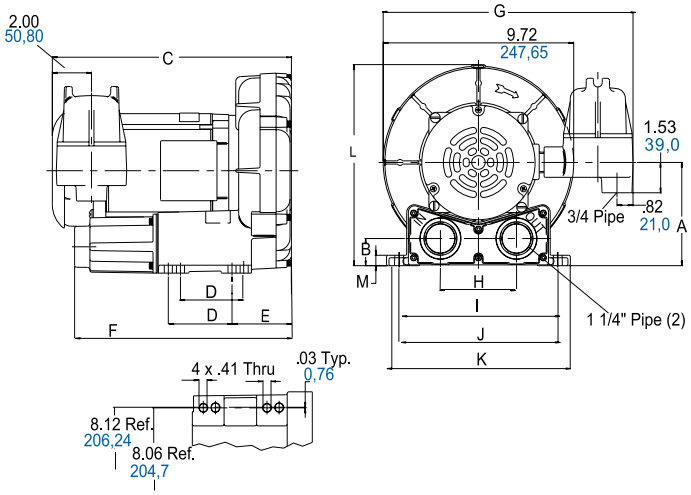
- Rugged design, maintenance free
- Quiet operation within OSHA standards
- Blowers and motors rated for continuous duty
- UL and CSA approved multi-voltage motors, incorporating approved thermal protection
- Motors classified as Explosion Proof Division 1 and 2, for Group D explosive atmospheres
- Motors carry full rated load at temperatures below Class B motor insulation limits
- Class F motor insulation used in motors larger than 1 HP
- Motors conform to NEMA frame sizes; motor enclosures conform to IP54 (suitable for outdoor use)
- Pilot duty thermal overload protection is standard on all 1 HP and larger motors
- Double sealed motor ball bearings with a B10 life exceeding 30,000 hours of continuous operation at the maximum rated continuous blower load
- Sealed air streams
- Aluminum impeller, housing and cover; viton shaft seal.
- Pressurized and leak-tested to less than 5cc/minute

Recommended Accessories	R3 Series	R4 Series	R4P Series	R5 Series	R6 Series	R6P Series	R7 Series
Pressure Gauge	AJ496	AJ496	AE133	AE133	AE133	AE133	AE133
Vacuum Gauge	AJ497	AJ497	AE134	AE134	AE134	AE134	AE134
Pressure Filter	AJ126C	AJ126D	AJ126D	AJ126D	AJ126F	AJ126F	AJ126G
Vacuum Filter (Inline)	AJ151C	AJ151D	AJ151D	AJ151E	AJ151G	AJ151G	AJ151H

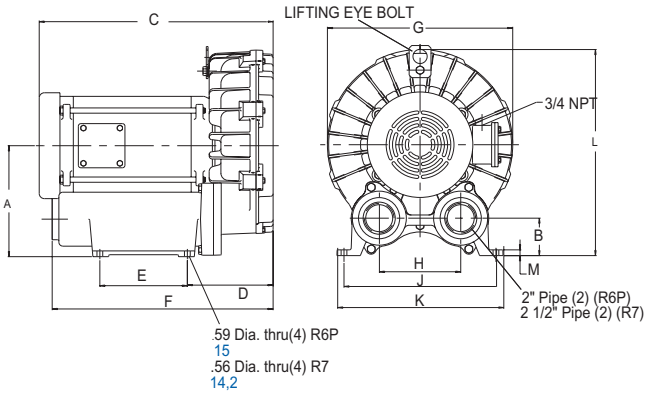
Gast Manufacturing Inc., A Unit of IDEX Corporation, Benton Harbor, MI USA • ph 616-926-6171 • fx 616-925-8288 • www.gastmfg.com

Product Dimensions (in. mm)

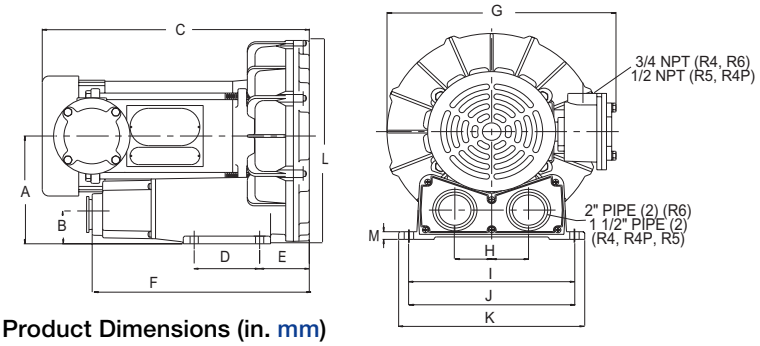
Model R3



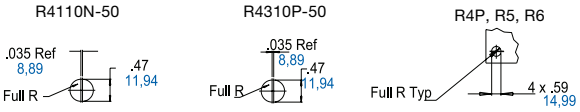
Models R6P, R7



Models R4, R4P, R5, R6



Mounting Hole Detail



Product Dimensions (in. mm)

Model	A	B	C	D	E	F	G	H	I	J	K	L	M
R3105N-50	5.21 132	1.37 35	12.3 312	3.25 83	3.06 78	11.06 281	12.75 324	3.88 99	8.06 205	8.12 206	9.38 238	10.15 258	.53 13
R41 10N-50	6.18 157	1.68 43	15.34 390	3.75 95	2.85 72	12.44 316	12.34 313	3.96 101	8.86 225	8.93 227	10.00 254	11.80 300	.44 11
R4310P-50	6.18 157	1.68 43	14.09 358	3.75 95	2.84 74	12.44 316	12.34 313	3.96 101	8.86 225	8.93 227	10.00 254	11.80 300	.44 11
R4P1 15N-50	6.98 177	1.84 47	17.41 442	4.50 114	3.25 83	13.93 354	13.75 349	4.75 121	10.25 260	10.31 262	11.75 298	13.61 346	.60 15
R5125Q-50	7.02 178	1.82 46	17.59 447	4.50 114	3.55 90	14.22 361	13.72 348	4.75 121	10.25 260	10.31 262	11.75 298	13.80 351	.59 15
R5325R-50	7.02 178	1.82 46	16.75 1425	4.50 114	3.55 90	14.22 361	13.56 344	4.75 121	10.25 260	10.31 262	11.75 298	13.80 351	.59 15
R6130Q-50	7.75 197	1.94 49	18.97 482	5.50 140	3.85 98	16.02 407	15.17 385	4.92 125	11.38 289	11.42 290	12.96 329	15.34 390	.52 13
R6340R-50	7.75 197	1.94 49	18.82 478	5.50 140	3.85 98	15.89 404	15.17 385	4.92 125	11.38 298	11.42 290	12.96 329	15.34 390	.52 13
R6P155Q-50	9.77 248	3.15 80	22.81 579	5.12 130	5.51 140	16.85 428	16.75 425	5.00 127	- -	11.42 290	12.80 325	18.14 461	.50 13
R6P355R-50	9.77 248	3.15 80	19.92 506	5.12 130	5.51 140	16.85 428	16.75 425	5.00 127	- -	11.42 290	12.80 325	18.14 461	.50 13
R7100R-50	10.79 274	3.64 92	22.77 578	8.36 212	8.50 216	21.50 546	18.00 457	7.90 201	- -	14.76 375	16.14 410	20.03 509	.56 14

Notice: Specifications subject to change without notice.

Product Specifications

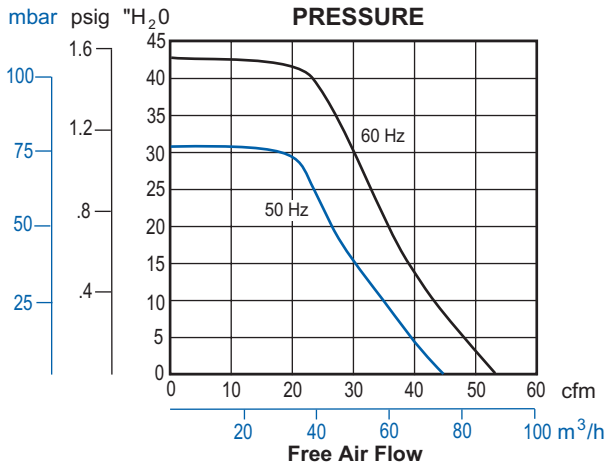
MODEL NUMBER		R3105N-50	R4110N-50	R4310P-50	R4P115N-50
Motor Enclosure		XPFC	XPFC	XPFC	XPFC
HP/kW	60 Hz	.50/0,37	1.0/0,75	1.0/0,75	1.5/1,1
	50 Hz	.33/0,25	.60/0,45	.60/0,45	1.0/0,75
Voltage	60 Hz	115/208-230-1	115/208-230-1	208-230/460-3	115/208-230-1
	50 Hz	110/220-240-1	110/220-240-1	220/380-3	110/220-240-1
Amps	60 Hz	5.2/2.9-2.6	11.4/6.2-5.6	3.4-3.3/1.6	20.3/11.2-10.6
	50 Hz	4.8/2.4-2.2	9.2/5.2-4.6	3.2/1.6	15.2/7.6-8
Starting Amps	60 Hz	12.5 @ 230V	36.5 @ 230V	19.7 @ 230V	60.6 @ 230V
	50 Hz	13 @ 220V	40.6 @ 240V	23.3 @ 220V	Consult Factory
Insulation Class		B	B	B	F
Recommended NEMA Starter Size		00/00	0/00	0/0	1/0
Net Weight (lbs/kg)		52/24	60/28	58/27	79/36

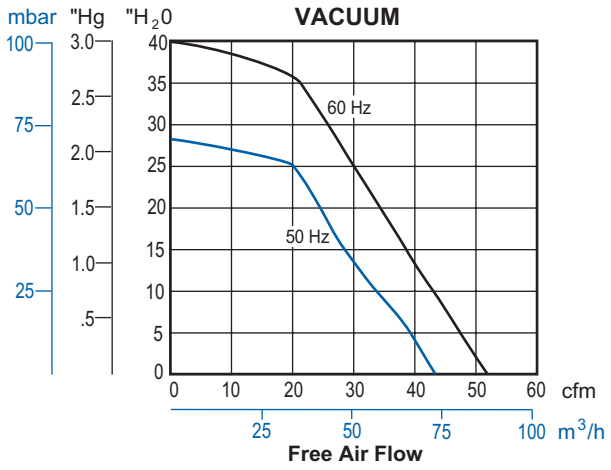
MODEL NUMBER		R5125Q-50	R5325R-50	R6130Q-50	R6340R-50
Motor Enclosure		XPFC	XPFC	XPFC	XPFC
HP/kW	60 Hz	2.0/1,5	2.0/1,5	3.0/2,2	4.0/3,0
	50 Hz	-	1.5/1,1	2.5/1,9	3.0/2,2
Voltage	60 Hz	115/230-1	208-230/460-3	230-1	208-230/460-3
	50 Hz	-	190-220/380-415-3	220-240-1	190-220/380-415-3
Amps	60 Hz	25/12.5	6.6-6.1/3.05	16.3	13-12/6
	50 Hz	-	5.0-4.4/2.5-2.6	14.7-13.5	14.4-13.4/7.2-6.8
Starting Amps	60 Hz	78 @ 230V	48 @ 230V	64 @ 230V	125 @ 230V
	50 Hz	-	Consult Factory	Consult Factory	Consult Factory
Insulation Class		F	F	F	F
Recommended NEMA Starter Size		1/0	0/0	1	1/0
Net Weight (lbs/kg)		77/35	75/34	129/59	112/51

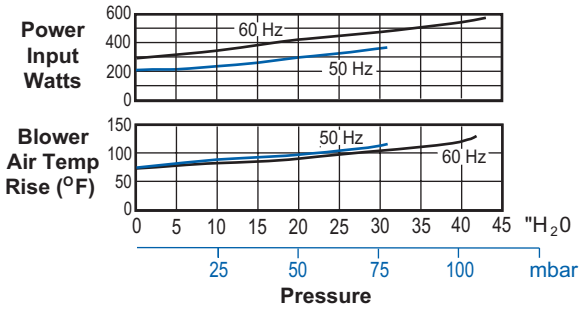
MODEL NUMBER		R6P155Q-50	R6P355R-50	R7100R-50
Motor Enclosure		XPFC	XPFC	XPFC
HP/kW	60 Hz	5.5/4,1	6.0/4,5	10/7,5
	50 Hz	4.0/3,0	4.5/3,4	8.0/6,0
Voltage	60 Hz	230-1	208-230/460-3	208-230/460-3
	50 Hz	220-240-1	190-220/380-415-3	190-220/380-415-3
Amps	60 Hz	29.9	20-18/9	26.5-24/12
	50 Hz	20.8-19.1	14.9-11/7.45-5.8	23.2-21.0/11.6-10.9
Starting Amps	60 Hz	198.4 @ 230V	59 @ 460V	105 @ 460V
	50 Hz	189 @ 240V	Consult Factory	Consult Factory
Insulation Class		F	F	F
Recommended NEMA Starter Size		0/2	1/0	2/1
Net Weight (lbs/kg)		243/110	233/105	297/134

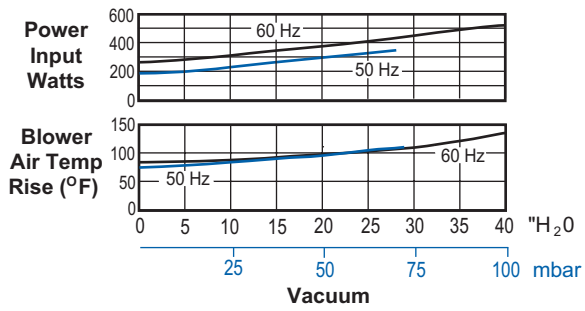
Gast Manufacturing Inc., A Unit of IDEX Corporation, Benton Harbor, MI USA • ph 616-926-6171 • fx 616-925-8288 • www.gastmfg.com

R3105N-50

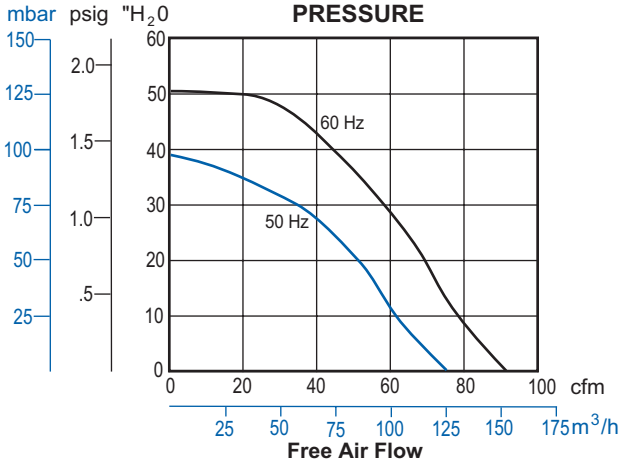


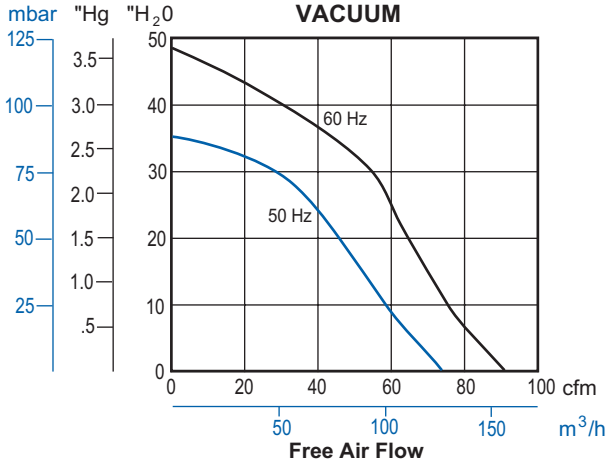


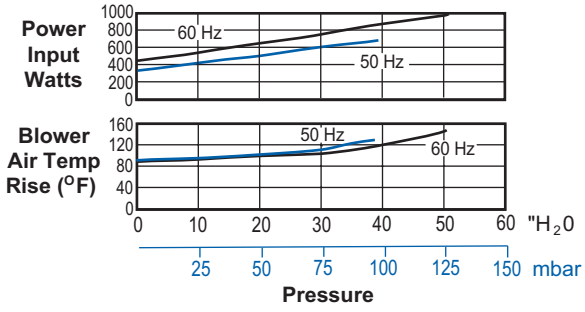


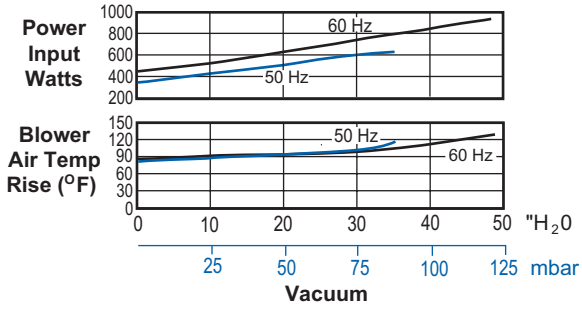


R4110N-50/R4310P-50









Appendix B

GZA SITE-SPECIFIC HEALTH, SAFETY & ACCIDENT PREVENTION STANDARD-PLAN

1. CLIENT/SITE/PROJECT INFORMATION		
Client: i.Park84, LLC		
Site Address: Sloop Brewery/Building 338 areas, Former IBM East Fishkill Facility, 2070 Route 52, Hopewell Junction, NY		
Site Description (be sure to list pertinent site features, chemicals used at the facility, and other potential hazard sources): The areas are indoor spaces associated with a large industrial-zoned complex. The Site has a TCE/PCE plume in the groundwater that is being actively remediated by IBM via pump-and-treat methods. Indoor areas consist of both vacant and active spaces.		
Work Environment (active manufacturing, office, vacant site, undeveloped property, etc.): Work environment will consist entirely of indoor work. Work will be conducted throughout the indoor portions of the Sloop Brewery and Building 338. Sloop Brewery is an active brewery, open to the public and Building 338 is currently vacant.		
Job/Project #: 12.0076252.10	Estimated Start Date: 3/20/2019	Estimated Finish Date: 3/20/2020
Site is Covered by the Following Regulations:	OSHA HAZWOPER Standard ☒	Mine Safety and Health Administration ☐
	OSHA Construction Regulations ☐	

2. EMERGENCY INFORMATION		
Hospital Name: St. Lukes Cornwall Hospital		Hospital Phone: 845-561-4400
Hospital Address: 70 Dubois Street, Newburgh, NY 12550		Directions and Street Map Attached: ☒ Yes
Local Fire #: 911 or 845-226-1652	Local Ambulance #: 911 or	Local Police #: 911 or 845-221-2111
WorkCare Incident Intervention Services:	**For non-emergencies, if an employee becomes hurt or sick call 888-449-7787**	
Other Emergency Contact(s):	Meredith Hayes Work: 973-774-3332 Cell: 631-682-0632	
Site-Specific Emergency Preparedness/Response Procedures/Concerns: Conduct daily tailgate safety meetings.		

- All EHS Events (incidents, first aid, near misses, unsafe acts/conditions, fires, chemical spills, property damage, and extraordinary safe behaviors) must be reported immediately to the Project Manager, and within 24hours to the EHS Event Reporting Portal at http://www.kelleronline.com. Username gempl1 Password 4Incidents*, or to the GZA People-Based Safety iPhone app.
- In the event of a chemical release greater than 5 gallons, site personnel will evacuate the affected area and relocate to an upwind location. The GZA Field Safety Officer and client site representative shall be contacted immediately.
- Site work shall not be conducted during severe weather, including high winds and lightning. In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.

3. SCOPE OF WORK	
General project description, and phase(s) or work to which this H&S Plan applies[1].	An SSDS pilot test will be conducted within the Sloop Brewery area. A soil vapor intrusion assessment will be conucted within Building 338.
Specific Tasks Performed by GZA:	GZA staff will conduct drilling operations through the slab, including 1 SVE well installed just below the slab and vapor monitoring point installations, if necessary. GZA will collect sub-slab and indoor air samples. GZA will also install permanent vapor monitoring points as necessary. GZA will also conduct the pilot test, which involves operating a shop-vac-type blower.
Concurrent Tasks to be Performed by GZA-hired Subcontractors (List Subcontractors by Name):	Sub-contractor will perform GPR within the Building areas to clear proposed locations.
Concurrent Tasks to be Performed by Others:	None

[1] Copy from or reference proposal or applicable design plan as appropriate.

Any OSHA PERMIT-REQUIRED CONFINED SPACE entry? ☐ YES ☒ NO IF YES, ADD CONFINED SPACE ENTRY PERMIT FOR THAT PORTION OF THE WORK	Any INDOOR fieldwork? ☒ YES ☐ NO IF YES, EXPLAIN:

4. SUB-SURFACE WORK, UNDERGROUND UTILITY LOCATION				
Will subsurface explorations be conducted as part of this work (drilling or excavation)?	☒ Yes ☐ No			
Will GZA personnel be required to use a hand-auger as part of this work?	☐ Yes ☒ No			
Site property ownership where underground explorations will be conducted on:	Public Access Property ☒ Yes ☐ No Private Property ☐ Yes ☒ No			
Have Necessary Underground Utility Notifications for Subsurface Work Been Made?	☐ Yes ☒ Yet to be conducted			
Specify Clearance Date & Time, Dig Safe Clearance I.D. #, And Other Relevant Information: The Client has provided GZA with a utility map, which is included in the sample location map. Prior to drilling operations, GZA will perform a visual recon of potential subsurface utilities and interview the Site manager.				
IMPORTANT! For subsurface work, prior to the initiation of ground penetrating activities, GZA personnel to assess whether the underground utility clearance (UUC) process has been completed in an manner that appears acceptable, based on participation/ confirmation by other responsible parties (utility companies, subcontractor, client, owner, etc.), for the following:				
Electric:	☐ Yes	☐ No	☐ NA	☐ Other_____
Fuel (gas, petroleum, steam):	☐ Yes	☐ No	☐ NA	☐ Other_____
Communication:	☐ Yes	☐ No	☐ NA	☐ Other_____
Water:	☐ Yes	☐ No	☐ NA	☐ Other_____
Sewer:	☐ Yes	☐ No	☐ NA	☐ Other_____
Other:_____	☐ Yes	☐ No	☐ NA	☐ Other_____
Comments:				

GZA SITE-SPECIFIC HEALTH, SAFETY & ACCIDENT PREVENTION STANDARD-PLAN

5. HAZARD ASSESSMENT (CHECK ALL THAT APPLY AND ADDRESS EACH HAZARD IN SECTION 6)

A. GENERAL FIELDWORK HAZARDS

☐ Confined Space Entry (Add Confined Space Entry Permit)	☒ Overhead Hazards (i.e. falling objects, overhead power lines)
☐ Abandoned or vacant building/Enclosed Spaces	☒ Portable Hand Tools or Power Tools
☒ Significant Slip/Trip/Fall Hazards	☐ Significant Lifting or Ergonomic Hazards
☐ Unsanitary/Infectious Hazards	☐ Electrical Hazards (i.e. Equipment 120 Volts or Greater, Work Inside Electrical Panels, or Maintenance of Electrical Equipment)
☐ Poisonous Plants	☐ Other Stored energy Hazards (i.e. Equipment with High Pressure or Stored Chemicals)
☐ Biting/Stinging Insects	☐ Fire and/or Explosion Hazard
☐ Feral Animal Hazards	☒ Elevated Noise Levels
☐ Water/Wetlands Hazards	☐ Excavations/Test Pits
☐ Remote Locations/Navigation/Orientation hazards	☐ Explosives or Unexploded Ordinance/MEC
☐ Heavy Traffic or Work Alongside a Roadway	☐ Long Distance or Overnight Travel
☐ Weather-Related Hazards	☐ Personal Security or High Crime Area Hazards
☒ Motor vehicle operation Hazards	☐ Working Alone
☒ Heavy Equipment Hazards	☐ Ionizing Radiation or Non-Ionizing Radiation
☐ Structural Hazards (i.e. unsafe floors/stairways/roof)	☒ Chemical/Exposure Hazards (See Part B for Details)
☐ Demolition/Renovation	☐ Other:
☒ Presence of Pedestrians or the General Public	

B. CHEMICAL/EXPOSURE HAZARDS (CONTAMINANTS ARE CONTAINED IN X SOIL, WATER, GROUNDWATER)

☐ No chemical hazards anticipated	☐ Methane
☐ Hydrogen Sulfide (H2S)	☐ Chemicals Subject to OSHA Hazard Communication (attach Safety Data Sheet for each chemical GZA brings to the site)
☐ Cyanides, Hydrogen Cyanide (HCN)	☐ Containerized Waste, Chemicals in Piping & Process Equipment
☐ Carbon Monoxide	☐ Emissions from Gasoline-, Diesel-, Propane-fired Engine, Heater, Similar Equipment
☐ Herbicides, Pesticide, Fungicide, Animal Poisons	☒ General Work Site Airborne Dust Hazards
☒ Metals, Metal Compounds: RCRA 8	☒ Volatile Organic Compounds (VOCs), BTEX
☐ Corrosives, Acids, Caustics, Strong Irritants	☒ Chlorinated Organic Compounds
☒ Polychlorinated Biphenyls (PCBs)	☒ Fuel Oil, Gasoline, Petroleum Products, Waste Oil
☒ Polycyclic Aromatic Hydrocarbons (PAHs)	☐ Asbestos
☐ Compressed Gases	☐ Oxygen Deficiency, Asphyxiation Hazards
☐ Flammable/Combustible Liquids	☒ Other: Silica dust
☐ Radiation Hazards (i.e. radioactive sealed/open source, x-rays, ultra violet, infrared, radio-frequency, etc.)	

6. SITE-SPECIFIC OVERVIEW OF H&S HAZARDS/MITIGATIONS (NOTE: Based on Hazard Assessment, Section 5)

Describe the major hazards expected to be present at the jobsite, and describe the safety measures to be implemented for worker protection (refer to items checked in Section 5 above). Use brief abstract statements or more detailed narrative as may be appropriate.

ON-SITE HAZARDS:	HAZARD MITIGATIONS:
Task Hazard Analyses	01.01 – Drilling Observations, 04.07 – Sub Slab Vapor Sampling, 20.11 – Field Sampling

Slip, Trips, and Falls	Inspect work area prior to starting work. Mark out or remove any potential hazards. Keep work area tidy and walkways free of tools.
Soil Sampling/Chemical Hazards	Wear proper PPE, including nitrile gloves. Wash hands before eating and drinking.
General Public	When working near areas Site employees might be working around, use cones and be aware of the pedestrians that may be walking or working near the work area.
Motor Vehicle Operation Hazards	Be aware of motor vehicle operations in the work area. Cone off locations where working. Wear high-visiblity clothing.
Portable Hand/Power Tools	Make sure all tools are grounded prior to use. Ensure power tool operator is familiar with the equipment. Keep all guards in place. Wear correct apparel when operating any power tools, do not weat loose clothing or hand jewelry. Inspect electrical cords for damage prior to use.
Lifting	Wear proper footwear (Steel toed boots or equivalent). Lift from the hips and not with the back.
Airborne Dust/Silica Dust	During all activities where concrete will be drilled, utilize a HEPA-filtered vacuum attached to collect all generated airborne silica dust.
Elevated Noise Levels	Wear hearing protection during operation of rotary drill.

7. AIR MONITORING ACTION LEVELS – Make sure air monitoring instruments are in working order, calibrated before use, and 'bump-checked' periodically throughout the day and/or over multiple days of use

Is air monitoring to be performed for this project? Yes ☐ No ☒

ACTION LEVELS FOR VOCS AND PARTICULATE HAZARDS (Action levels apply to occupied work space in general work area)

☐ Applicable, See Below. ☒ Not Applicable

Parameter	Response Actions for Elevated Airborne Hazards
VOCs	N/A
Particulates	N/A

ACTION LEVELS FOR INHALATION OF TOXIC/HAZARDOUS SUBSTANCES (Action levels are for sustained breathing zone concentrations)

☐ Applicable, See Below. ☒ Not Applicable

Air Quality Parameters (Check all that apply)	Remain in Level D or Modified D	Response Actions for Elevated Airborne Hazards
☐ VOCs	0 to	From ppm to 25 ppm: Proceed to Level C, or Ventilate, or Discontinue Activities If greater than 25 ppm: Discontinue Activities and consult EHS Team
☐ Carbon Monoxide	0 to	At greater than ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities.
☐ Hydrogen Sulfide	0 to	At greater than ppm, exit area, provide adequate ventilation, proceed to Level B, or discontinue activities
☐ Dust	0 to	
☐	0 to	

SPECIAL INSTRUCTIONS/COMMENTS REGARDING AIR MONITORING (IF APPLICABLE)

8. HEALTH AND SAFETY EQUIPMENT AND CONTROLS

AIR MONITORING INSTRUMENTS

- ☐ PID Type: MiniRae Lite Lamp Energy: 10 eV
- ☐ FID Type:
- ☐ Carbon Monoxide Meter
- ☐ Hydrogen Sulfide Meter
- ☐ O_2/LEL Meter
- ☐ Particulate (Dust) Meter
- ☐ Calibration Gas Type isobutylene
- ☐ Others:

OTHER H&S EQUIPMENT & GEAR

- ☐ Fire Extinguisher
- ☒ Caution Tape
- ☒ Traffic Cones or Stanchions
- ☐ Warning Signs or Placards
- ☐ Decon Buckets, Brushes, etc.
- ☐ Portable Ground Fault Interrupter (GFI)
- ☐ Lockout/Tagout Equipment
- ☐ Ventilation Equipment
- ☐ Others:

PERSONAL PROTECTIVE EQUIPMENT

- ☐ Respirator – Type
- ☐ Respirator - Cartridge Type:
- ☒ Hardhat
- ☒ Outer Gloves Type: Nitrile
- ☐ Inner Gloves Type:
- ☒ Steel-toed boots/shoes
- ☐ Coveralls – Type
- ☐ Outer Boots – Type
- ☒ Eye Protection with side shields
- ☐ Face Shield
- ☒ Traffic Vest
- ☐ Personal Flotation Device (PFD)
- ☐ Fire Retardant Clothing
- ☐ EH (Electrical Hazard) Rated Boots, Gloves, etc.
- ☒ Noise/Hearing Protection
- ☐ Others:

Discuss/Clarify, as Appropriate:

9. H&S TRAINING/QUALIFICATIONS FOR FIELD PERSONNEL

- ☒ Project-Specific H&S Orientation (Required for All Projects/Staff)
- ☒ OSHA 40-Hour HAZWOPER/8 Hour Refreshers
- ☒ Hazard Communication (for project-specific chemical products)
- ☒ First Aid/CPR (required for HAZWOPER for at least one individual on site)
- ☒ Current Medical Clearance Letter (required for HAZWOPER)
- ☐ OSHA 10-hour Construction Safety Training
- ☐ Fall Protection Training
- ☐ Trenching & Excavation
- ☐ Lockout/Tagout Training
- ☐ Electrical Safety Training
- ☐ Bloodborne Pathogen Training
- ☐
- ☐
- ☐
- ☐
- ☐

Discuss/Clarify, as needed:

10. PERSONNEL AND EQUIPMENT DECONTAMINATION (SECTION ONLY REQUIRED FOR HAZWOPER SITES)

Describe personnel decontamination procedures for the project site, including "dry decon" (simple removal of PPE)	Perform dry decon as necessary.

11. PROJECT PERSONNEL - ROLES AND RESPONSIBILITIES

GZA ON-SITE PERSONNEL:

Name(s)	Project Title/Assigned Role	Telephone Numbers
Ben Romagnoli	Site Supervisor	Work: 973-774-3341 Cell: 315-382-6774
Ben Romagnoli	Field Safety Officer	Work: 973-774-3341

		Cell: 315-382-6774
Ben Romagnoli	First Aid Personnel	Work: 973-774-3341 Cell: 315-382-6774
Ben Romagnoli	GZA Project Team Members	Work: 973-774-3341 Cell: 315-382-6774

Site Supervisors and Project Managers (SS/PM): Responsibility for compliance with GZA Health and Safety programs, policies, procedures and applicable laws and regulations is shared by all GZA management and supervisory personnel. This includes the need for effective oversight and supervision of project staff necessary to control the Health and Safety aspects of GZA on-site activities.

Field Safety Officer (FSO): The FSO is responsible for implementation of the Site Specific Health and Safety Plan.

First Aid Personnel: At least one individual designated by GZA who has current training and certification in basic first aid and cardiopulmonary resuscitation (CPR) must be present during on-site activities involving multiple GZA personnel at HAZWOPER sites.

GZA Project Team: Follow instructions relayed by the HASP and GZA manager on-site.

OTHER PROJECT PERSONNEL:

Name	Project Title/Assigned Role	Telephone Numbers
David Winslow	Principal-in-Charge	Work: 973-774-3307 Cell: 347-242-7107
Meredith Hayes	Project Manager	Work: 973-774-3332 Cell: 631-682-0632
Lauren Schoenemann	Health and Safety Coordinator (HSC)	Work: 973-774-3308 Cell: 201-274-4622
Richard Ecord	GZA EHS Director	Work: 781-278-3809 Cell: 404-234-2834

Principal-in-Charge: Responsible of overall project oversight, including responsibility for Health and Safety.

Project Manager: Responsible for day-to-day project management, including Health and Safety.

Health and Safety Coordinator: General Health and Safety guidance and assistance.

GZA EHS Director: H &S technical and regulatory guidance, assistance regarding GZA H&S policies and procedures.

12. PLAN ACKNOWLEDGEMENT AND APPROVALS

GZA Project Site Worker Plan Acknowledgement

I have read, understood, and agree to abide by the information set forth in this Safety and Accident Prevention Plan. I will follow guidance in this plan and in the GZA Health and Safety Program Manual. I understand the training and medical monitoring requirements covered by the work outlined in this plan and have met those requirements.

GZA Employee Name	GZA Employee Signature	Date

Subcontractor Site Worker Plan Acknowledgement

GZA has prepared this plan solely for the purpose of protecting the health and safety of GZA employees. Subcontractors, visitors, and others at the site must refer to their organization's health and safety program or site-specific HASP for their protection. Subcontractor employees may use this plan for general informational purposes only. Subcontractor firms are obligated to comply with safety regulations applicable to their work, and understand this plan covers GZA activities only.

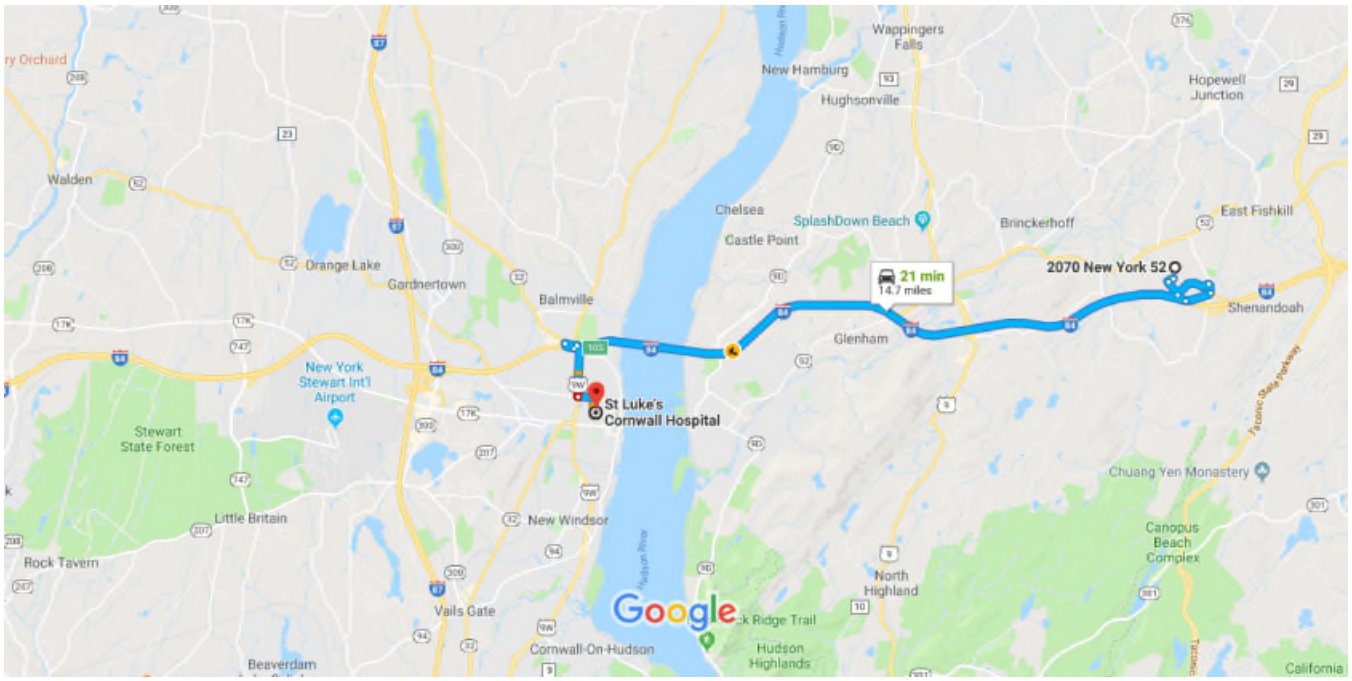
Subcontractor Employee Name	Subcontractor Employee Signatures	Date

GZA HASP Approval Signatures		
The following individuals indicate their acknowledgement and/or approval of the contents of this Site Specific H&S Plan based on their understanding of project work activities, associated hazards and the appropriateness of health and safety measures to be implemented. A signed copy of this document must be present at the project site at all times work is being performed.		
GZA Author/Reviewer Role	Signature	Date
HASP Preparer		**3/14/19**
EHS Reviewer		**3/16/19**
Principal in Charge		**3/14/19**

Google Maps

2070 NY-52, Hopewell Junction, NY to St Luke's Cornwall Hospital

Drive 14.7 miles, 21 min



Map data ©2019 Google 2 mi

2070 NY-52

Hopewell Junction, NY 12533

Get on I-84 from South Dr

3 min (1.7 mi)

1. Head southwest on Development Dr toward West Dr
   Restricted usage road

0.1 mi

2. Turn left onto West Dr
   Restricted usage road

0.3 mi

3. Turn left onto South Dr
   Restricted usage road

0.6 mi

4. Turn right onto Lime Kiln Rd
   Partial restricted usage road

0.2 mi

5. Use the right 2 lanes to take the I-84 W ramp

0.5 mi

Follow I-84 to NY-32 S/N Plank Rd in Balmville. Take exit 10S from I-84

11 min (11.3 mi)

6. Merge onto I-84

11.1 mi

7. Take exit 10S for NY-32 toward US-9W S/Newburgh

0.2 mi

Take US-9W S/Robinson Ave and Dubois St to your destination in Newburgh

6 min (1.7 mi)

8. Turn right onto NY-32 S/N Plank Rd (signs for Route 9w S)

0.2 mi

9. Use the right 2 lanes to turn right onto US-9W S/Robinson Ave

0.9 mi

10. Turn left onto South St

0.3 mi

11. Turn right onto Dubois St

0.3 mi

12. Turn left

246 ft

13. Turn left

Destination will be on the left

125 ft

St Luke's Cornwall Hospital

70 Dubois St, Newburgh, NY 12550

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 – General Outdoor Field Work		
Observation of Deploying of Traffic Protection Equipment by Drilling Contractor (e.g., cones, signs, etc.)	Personal injury due to vehicle traffic, Collisions, injuries	Wear high visibility vest at all times when out of vehicle.
		Park in designated parking locations or select off-road areas that are firm and free of hazards. Directly inspect parking location on foot if necessary.
		Use emergency flashers or other appropriate vehicle warning system as appropriate to local conditions when parking personal or GZA vehicle and/or equipment.
		If parking outside of a designated parking area, demarcate vehicle with traffic cones or equivalent.
		Use emergency flashers or other appropriate vehicle warning system when placing equipment.
		Observe if police detail or other required traffic control system (if necessary) is in place.
		Stay within the confines of the work area and do not venture outside of the demarcated work area into traffic.
		If you observe that contractor may back into structures, vehicles, fences, etc., notify contractor immediately with pre-determined signals. Do not cross the path of the heavy equipment.
		Stand clear of moving Drill Rig.
Observation of Mobilizing Drill Rig To Job Site and positioning at borehole by Drilling Contractor	Struck by drill rig	Before drilling begins, confirm that drill rig has been parked properly and securely by the drilling contractor.
		Wear high visibility vests. Make sure that the driver can see you and is aware of your location at all times.
		Inform the driller if it is observed that the rig is being moved with the mast raised and/or tools and other equipment on the rig are not secured and can fall over and potentially hurt personnel.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
	Overhead utility	Look overhead to assess if any utilities are present and confirm with driller that they are aware of the overhead utility location and to take appropriate actions to prevent contact with the overhead utilities and to minimize any arc flash hazards. Review GZA's Electrical Safe Work Practices Program 03-3003.
Observation of drilling operations and monitoring well installations	Underground utilities	Confirm that underground utility clearance procedures have been completed in accordance with GZA Policy # 04-0301 *Responsibility for Utility Clearance of Exploration Locations* for clearing utility locations prior
	Moving machinery, rotating parts, cables, ropes, etc.	Do not wear loose fitting clothing.
		All GZA personnel working in proximity to a drill rig will be familiarized with the location and operation of emergency kill switches prior to equipment start-up. Maintain safe distance from rotating auger, drill casing, rods and cathead at all times. Observe operations from a safe distance. Persons shall not pass under or over a moving stem or auger Check that "kill" switches are present and working. Confirm with driller that daily inspection of rig has been performed prior to commencing work and no conditions were noted with the rig that would affect its proper operation.
		Do not touch or operate or assist with any rig operations and maintenance work.
		Make eye contact with operator before approaching equipment.
		Be alert and take proper precautions regarding slippery ground surfaces and similar hazards near rotating auger.
		Do not engage the driller or helper when drill is in operation. Work out prearranged signals to get their attention before approaching them.
		Confirm prior to drilling operations that driller and helper communicate and coordinate their actions and movements.
		GZA personnel are not allowed to be on the drill rig or operate a rig.

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear steel toed boots, hardhat and side-shielding safety glasses/goggles.
	Falling objects, debris	Stand clear of stacked drill rods. If stack appears unstable inform driller.
	Noise	Wear appropriate hearing protection.
	Roadway/traffic hazards	Be alert at all times; never step outside traffic cones.
		Wear high visibility vests at all times.
		Be familiar with escape routes at each location.
		Follow project Traffic Control Plan. Be alert at all times and never step outside the traffic cones. Use a Police detail when necessary.
	Slips, trips and falls	Maintain clean and sanitary work area free of tripping/slipping hazards.
		All borings, excavations, or partially completed groundwater monitoring wells will be adequately covered and/or barricaded if left unattended for any period of time to prevent injury.
		Store any hand tools used for sampling in their proper storage location when not in use.
		Provide adequate space for each employee to work safely with sound footing.
		Do not perform work if adequate lighting is not available.
		Maintain an exit pathway away from the rig at all times.
	Cuts, bruises, shocks, lacerations, sprains and strains during tool use	When working with a driller, do not assist the drilling crew with their work.
		Use properly maintained tools; do not use damaged tools.
		Wear the proper Personal Protective Equipment based on the task being performed.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices. Do not use electrical tools in wet areas.
		Coordinate activities with driller. Allow driller to open sampling equipment (i.e., split spoons, Geoprobe sleeves, etc.)
	Fire hazards	Be familiar with emergency procedures and where fire extinguishers are present on site.

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Inform GZA subcontractor if you observe improper storage of used rags and unsafe storage of flammable/combustible liquids brought on site.
		GZA and its subcontractors, suppliers and vendors shall not smoke in the work area in GZA project sites. Smoking can only be in designated smoking areas away from work areas and potential fire hazard locations.
		Confirm with driller that a fire extinguisher present with rig and will be available at all times and that inspection tag is not expired.
		If driller is welding or cutting on site confirm there are no flammables or combustible materials near the vicinity of welding machines or torches (such as debris, fuels, grass/weeds, etc.). Review Site requirements for obtaining "Hot Work Permit".
		Stand well clear of welding/cutting/burning areas.
		When drilling activities encounter the presence of gas or electric, the drill crew shall immediately curtail drilling activity, shut down the drill rig and contact the Project Manager.
	Exposure to Hazardous Substances/Chemicals	Become familiar with hazards associated with hazardous commercial products used in drilling (fuels, silica sand, grout, cement, bentonite, etc.). Review Safety Data Sheets (SDSs) for such products and participate in daily safety tailgate meetings.
		Do not handle drilling chemicals.
		Wear appropriate personal protective equipment.
		Review hazards of chemicals that may have been used or currently are being used on site.
		Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history). Assess whether procedures and contingencies are in place for characterizing hazards and protecting workers by use of appropriate air monitoring, personal protective clothing and respiratory protection, as needed. If contamination is identified at the Site only personnel trained and medically qualified to work on hazardous sites will be permitted to proceed with the work.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Drilling Observations, Monitoring Well Installation Observation and Soil Sampling		
Analysis By: Andrew Whitsitt	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: October 2, 2011 **Revised: June 14, 2012**	**Date: June 14, 2012**	**Date: June 26, 2012**

Task 4.1
DRILLING OBSERVATIONS, MONITORING WELL INSTALLATION OBSERVATIONS, SOIL SAMPLING

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Sampling Soil	Exposure to chemicals	Refer to the site specific HASP for chemical hazards and the necessary precautions required for sampling.
		Understand potential hazards associated with handling sample collection preservatives.
		Review and have SDS available for chemicals being brought on site, including that of sample preservatives.
		Wear appropriate PPE identified in the HASP
		Wash hands before eating and drinking. Eating and drinking are prohibited in areas of soil contamination/work area.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Sub-Slab Vapor Sampling		
Analysis By: Guy Dalton	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 29, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.7
Sub-Slab Vapor Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 4.1 Drilling Observations, Monitoring Well Installation Observations and Soil Sampling 4.5 Soil-Gas Sampling 4.6 Temporary/Permanent Sampling Equipment Operation 21.1 General Outdoor Field Work NOTE - As a sampling THA, this THA assumes the subsurface vapor sampling well(s) or port(s) have already been installed.		
Screening Work Zone Atmosphere	Exposure to Hazardous Substances	Review site specific Health and Safety Plan and implement work practices and procedures specified.
		Monitor breathing air in work zone for hazardous atmospheres (e.g., low oxygen, elevated VOCs, H_2S, CO, etc.) and do not proceed unless it is determined that no hazardous conditions exist.
		Be alert for hazardous site contaminants (as indicated by odor, visual characteristics, location, and site history). Procedures and contingencies must be in place for characterizing hazards and protecting workers by use of appropriate personal protective clothing and respiratory protection, as needed.
		Wash hands prior to eating or drinking.
	Working Alone	If working alone on site, sign out or call into the office to leave site specific information where you are working, the anticipated duration/hours of work on site. Do this for each site if multiple in one day. Review GZA's *Working Alone* Policy 03-1009.
		Call office when off site.
		Store hand tools in their proper storage location when not in use.
	Slips, trips and falls	Provide adequate space for each employee to work safely with sound footing.
		Provide adequate lighting.
Constructing Sampling Train	Electrical shocks, cuts, bruises, from Tool-Related use	Do not use electrical tools with damaged cords or other electrical components.
		Observe proper electrical safety practices. Review GZA's Electrical Safe Work Practices Program 03-3003

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Sub-Slab Vapor Sampling		
Analysis By: Guy Dalton	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: September 29, 2011 **Revised: June 22, 2012**	**Date: June 22, 2012**	**Date: June 26, 2012**

Task 4.7
Sub-Slab Vapor Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Tools must be properly maintained; do not use damaged tools.
		Wear proper Personal Protective Equipment.
		Store and carry tools correctly.
		Use the correct tool for the job.
		Protect “off hand” from gouges, hammer blows, cutting tools, etc. Position your “off hand” to prevent injury in case of slip of the tool.
		If using 12-volt DC pump to purge sampling train, inspect power cord and battery terminal connectors, which must be free of defects or damage.
		If using 120-volt AC pump to purge sampling train, verify that the ground fault circuit interrupter (GFCI) is functioning properly and cords and connectors are free of defects
Evaluating Leaks in Sampling Train	Working with Pressurized Cylinders (Helium)	Use caution when screwing in pressure regulator and valve (if this wasn’t already done by the helium vendor). Take care not to hit the regulator and valve once it is installed and do not drop the cylinder. Cylinder should remain on the ground surface at all times or (ideally) fixed to a cylinder dolly.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: Field Sampling

Analysis By: Christie Wagner	**Reviewed By: Jayanti Chatterjee, CIH**	**Approved By: Jayanti Chatterjee, CIH**
Date: November 4, 2011 **Revised: July 12, 2012**	**Date: July 12, 2012**	**Date: July 12, 2012**

Task 20.11
Field Sampling

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Review Related THA's – 21.1 General Outdoor Field Work		
Pre work task for site visit	Adverse Weather Conditions	Assess weather conditions prior to on-site work and examine forecast for anticipated period of work.
		Dress appropriately for weather conditions (e.g., precipitation, temperature ranges over anticipated duration of field work).
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Be aware of the anticipated weather conditions prior to mobilization to the site. Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightening, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
Conduct visual inspection of site	Dangerous Terrain	Be aware of the site terrain, watch for holes and rocks that can be tripping hazards
		Learn to identify and watch for plants such as thorn bushes and poision ivy that can either scratch you or give you a rash.
Collecting sample	Muscle strain from lifting heavy objects	Use proper lifting techniques. Use appropriate mechanical assistance and tools when possible. Wear work gloves and steel toed boots.
	Exposure to unknown sample	Be sure to treat effluent samples as unknowns and wear the proper PPE.
		If there are any unusual odors/fumes coming from a sample, especially those that cause reactions in the eyes or nose, leave the area and inform a supervisor immediately.

Appendix C

Known for excellence.
Built on trust.

Quality Assurance/Quality Control Project Plan (QAPP)

Sloop Brewery/Building 338 Vapor Intrusion Sampling
Former IBM East Fishkill Facility
2070 Route 52,
Hopewell Junction, NY

NYSDEC Site No. 314054
EPA ID No. NYD000707901

March 19
File No. 12.0076252.10

PREPARED FOR:
i.Park84, LLC
485 West Putnam Avenue
Greenwich, CT 06830

GZA GeoEnvironmental, Inc.
55 Lane Road | Fairfield, NJ, 07004
973-774-3300

31 Offices Nationwide
www.gza.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY 1

3.0 QA OBJECTIVES FOR DATA MANAGEMENT 1

4.0 SAMPLING PLAN 4

4.1 SUBSLAB SOIL VAPOR SAMPLING 4

4.2 INDOOR AND BACKGROUND AIR SAMPLING 4

4.3 QUALITY CONTROL SAMPLE COLLECTION 5

4.4 SAMPLE PRESERVATION AND CONTAINERIZATION 5

4.5 EQUIPMENT DECONTAMINATION 5

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY 6

5.1 SAMPLE COLLECTION DOCUMENTATION 6

5.1.1 Field Notes 6

5.1.2 Chain-of-Custody Records 7

5.1.3 Sample Labeling 7

5.2 SAMPLE CUSTODY 9

5.2.1 Field Custody Procedures 9

5.2.2 Laboratory Custody Procedures 10

6.0 CALIBRATION PROCEDURES 11

6.1 FIELD INSTRUMENTS 11

6.2 LABORATORY INSTRUMENTS 11

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES 11

8.0 DATA REDUCTION, VALIDATION, AND REPORTING 12

8.1 DATA EVALUATION/VALIDATION 12

8.1.1 Field Data Evaluation 12

8.1.2 Data Usability 12

TABLE OF CONTENTS

8.2 IDENTIFICATION AND TREATMENT OF OUTLIER 13

9.0 INTERNAL QUALITY CONTROL 13

10.0 CORRECTIVE ACTION 13

10.1 IMMEDIATE CORRECTIVE ACTION 14

TABLES

TABLE 1 SOIL VAPOR CRITERIA TABLE

TABLE 2 ANALYTICAL PARAMETERS, METHODS, PRESERVATION, HOLDING TIME AND CONTAINER REQUIREMENTS

TABLE 3 TYPICAL LABORATORY DATA QUALITY OBJECTIVES: SOIL GAS SAMPLES

1.0 INTRODUCTION

This Quality Assurance/Quality Control Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the subslab depressurization (SSDS) workplan at Sloop Brewery (Building 330C) and the soil vapor intrusion (SVI) assessment at Building 338, part of the Former IBM East Fishkill Facility development in Hopewell Junction, New York.

The Plan describes specific protocols for field sampling, sample handling and storage, chain-of-custody, laboratory analysis, and data handling and management. Preparation of the plan was based on EPA Quality Assurance Project Plan guidance documents, including:

- EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001); and
- Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).

The data generated from the analysis of samples will be used to characterize subslab, indoor and ambient air in the Sloop Brewery area (portion of Building 330C) and in Building 338. If the potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), is shown in **Table 1**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

A qualified person will coordinate and manage the Site sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. A qualified environmental professional (QEP), as defined by the New York State Department of Environmental Conservation (NYSDEC) will direct the sampling activities and coordinate laboratory and drilling activities.

A qualified person will insure that the QA/QC plan is implemented and will oversee data validation. A qualified person will provide oversight and technical support for the sampling and analytical procedures followed in this project. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The QEP is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

Laboratories used will be New York State Department of Health (NYSDOH) environmental laboratory accreditation program (ELAP) certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, shipping coolers, and laboratory documentation.

3.0 QA OBJECTIVES FOR DATA MANAGEMENT

The analytical data will be provided by the laboratory using the New York State Department of Environmental Conservation (NYSDEC) Category B deliverable format. Analytical data collected for disposal characteristics that may be requested by off-site soil or wastewater disposal facilities will be provided in the format that the facility requests.

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent units for soil vapor and air samples in micrograms per cubic meter ($\mu g/m^3$) for soil vapor and air samples. **Table 2** presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, and completeness.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs. Specific procedures for sampling, chain of custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of this Plan. **Table 3** presents the precision and accuracy requirements for each parameter to be analyzed.

The QA objectives are defined as follows:

- ***Accuracy*** is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

  Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., split spoons, groundwater sampling pumps).

  The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. **Table 3** summarizes the laboratory accuracy requirements.

- ***Precision*** is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

  Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative

samples per matrix per analytical parameter, with the exception of the TCLP parameters and parameters associated with wastewater samples. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be < 30 for soil samples and < 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are < 5x the quantitation limit, the criterion will be doubled. Due to the uncertainty of available representative soil gas volume, field duplicates will not be collected for this matrix.

Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil, sediment and water analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be assessed through the analysis of matrix duplicates and field duplicates. For soil gas analyses, laboratory precision will be assessed through the analysis of matrix duplicates. MS/MSD samples or matrix duplicates will be performed at a frequency of one per twenty investigative samples per matrix per parameter. **Table 3** summarizes the laboratory precision requirements.

- ***Completeness*** is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

  Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

  Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

- ***Representativeness*** is a qualitative parameter that expresses the degree to which data accurately and precisely represent either 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. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

  Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling, sample handling, and sample preservation techniques are used.

  Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

- ***Comparability*** expresses 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 Work Plans and QAPP are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

  Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

4.0 SAMPLING PLAN

Environmental sampling will include subslab, indoor and ambient air. Air samples will be collected using laboratory provided SUMMA® canisters.

4.1 SUBSLAB SOIL VAPOR SAMPLING

Soil vapor extraction (SVE) wells will be installed via rotary methods to a maximum of one foot below the building baseslab. SVE wells will consist of 2-inch, schedule 40, 60-slot polyvinyl chloride (PVC) pipe. Support silica sand will be used to fill the annular space around the extraction well.

Subslab soil vapor samples will be collected from SVE wells. Prior to sampling, the SVE wells will be purged at a flow rate not greater than 0.2 liters/minute to evacuate one to three sampler volumes using a vacuum pump (Gilian Air pump or equiavalent). During purging, helium will be used as a tracer gas to evaluate the potential for infiltration of outdoor air into the sample. Helium integrity testing will be performed on each subslab vapor extraction point following installation to confirm air tight seals around the slab penetration. Helium integrity testing will involve placing a plastic shroud over the newly installed extraction point and sealing all penetrations with hydrated bentonite or putty. New Teflon sample tubing will be connected to the sample point which will run out through the plastic shroud and it will be connected to a 0.5-liter Tedlar© bag via a peristaltic or Gillian air sampling pump. The Tedlar© bag will be analyzed in the field using a Marks Model 9822 helium detector to check for short circuiting of outside air into the sampling port. If helium is detected at a concentration of greater than 10 percent, the soil gas point will be resealed with hydrated bentonite. The point will then be retested to ensure that the helium gas concentration is less than 10 percent.

Following the purging period, each probe will be connected to an evacuated laboratory-supplied SUMMA® canister. SUMMA® canisters are passivated stainless steel vessels that have been cleaned and certified contaminant-free by the contract laboratory. After connecting the SUMMA® canister to the soil gas probe, a regulator valve on the canister will be opened and the vacuum will slowly draw the sample into the canister over a period of 20 minutes. The samples will not be drawn at greater than 0.2 liters per minute. Quantitation limits for all analytes range between 1.6 ppbV and 4.0 ppbV, depending on the compound. After collecting the soil gas sample, the valve will be closed and disconnected from the soil gas probe. The soil-gas samples will be transported to a NYSDOH ELAP certified laboratory for TO-15 analysis.

When soil vapor samples are collected, the following conditions that may influence the interpretation of results will be documented:

- Identification of any nearby commercial or industrial buildings that likely uses volatile organic compounds;
- A sketch of the Site, showing streets, neighboring commercial or industrial facilities (with estimated distances to the Site, and soil-gas sampling locations);
- Weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction); and
- Any pertinent observations, such as odors or readings from field instrumentation.

4.2 INDOOR AND BACKGROUND AIR SAMPLING

Indoor air samples will be collected in accordance with Section 2.7.3 of NYSDOH's VI Guidance document. GZA will collect one co-located indoor air sample in the vicinity of each subslab sample locations.

The indoor air sample will be collected using a laboratory supplied SUMMA© canister. The sampling duration reflect the exposure scenario being evaluated. GZA assumes, after full occupancy the buildings (330C and 338) will be operating for 24 hours. As a result, the indoor air samples will be collected over 24 hours sample collection time. The flow controllers for the SUMMA© canister will be set to collect it at 24-hour cycle. GZA personnel will ensure that SUMMA© canister flow regulators are turned off before the end pressure reaches zero.

Two background samples will be collected using laboratory supplied SUMMA© canisters. One sample will be collected upwind and one sample downwind of the respective building. A duplicate sample will also be collected at one of the background sample locations, as described below. Background samples will be placed in undisturbed locations adjacent to the respective building. The sample collection time will be 24-hours. GZA personnel will ensure that the SUMMA© canister flow regulators are turned off before the end pressure reaches zero.

4.3 QUALITY CONTROL SAMPLE COLLECTION

QC samples will include field duplicates.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by co-locating a second SUMMA® canister at one of the background air sampling locations. Field duplicates will be submitted at a frequency of one per 20 samples for all air samples.

4.4 SAMPLE PRESERVATION AND CONTAINERIZATION

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's Specifications and Guidance for Contaminant-Free Sample Containers. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate (see **Table 2**).

Table 3 presents a summary of QC sample preservation and container requirements.

4.5 EQUIPMENT DECONTAMINATION

Re-usable Teflon®, stainless steel, and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface
- Tap water rinse
- Wash and scrub with Alconox and water mixture
- Tap water rinse
- Distilled/deionized water rinse
- Air dry

Cleaned equipment shall be wrapped in aluminum foil if not used immediately after air-drying.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1 SAMPLE COLLECTION DOCUMENTATION

5.1.1 Field Notes

Field team members will keep a field logbook to document all field activities. Field logbooks will provide the means of recording the chronology of data collection activities performed during the remediation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory.

The logbook will be a bound notebook with water-resistant pages. Logbook entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page of each logbook should contain the following:

- Person to whom the logbook is assigned
- The logbook number
- Project name and number
- Site name and location
- Project start date
- End date

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook should include, but may not be limited to, the following:

- Chronology of activities, including entry and exit times
- Names of all people involved in sampling activities
- Level of personal protection used
- Any changes made to planned protocol
- Names of visitors to the site during sampling and reason for their visit
- Sample location and identification
- Changes in weather conditions
- Dates (month/day/year) and times (military) of sample collection

- Measurement equipment identification (model/manufacturer) and calibration information
- Sample collection methods and equipment
- Sample depths
- Whether grab or composite sample collected
- How sample composited, if applicable
- Sample description (color, odor, texture, etc.)
- Sample identification code
- Tests or analyses to be performed
- Sample preservation and storage conditions
- Equipment decontamination procedures
- QC sample collection
- Unusual observations
- Record of photographs
- Sketches or diagrams
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Field Team Leader. Logbooks will be supported by standardized forms.

5.1.2 Chain-of-Custody Records

Sample custody is discussed in detail in **Section 5.2** of this Plan. Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection, and whether the sample is grab or composite; (4) signatures of individuals involved in sampling; and (5) if applicable, air bill or other shipping number. Sample receipt and log-in procedures at the laboratory are described in **Section 5.2.2** of this Plan.

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service. Sample packaging and shipping procedures, and field chain-of-custody procedures are described in **Section 5.2.1** of this Plan.

5.1.3 Sample Labeling

Immediately upon collection, each sample will be labeled with a pre-printed adhesive label, which includes the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identifier.

A. The following identification scheme will be used:

Subslab soil vapor samples will be assigned sequential numbers. For soil vapor samples collected from the SVE wells, sample numbers will be assigned as follows:

SS-#

Indoor air samples will also be assigned sequential numbers, matching their co-located subslab soil vapor samples. For indoor air, samples will be assigned as follows:

IA-#

Background (ambient) air samples will be assigned sequential numbers. For background air, samples will be assigned as follows:

AA-#

Example:

Sample SS-4 = subslab soil vapor collected from location number 4.

Duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

A. The analysis required will be indicated for each sample.

   Example: TO-15

C. Date taken will be the date the sample was collected, using the format: MM-DD-YY.

   Example: 03-22-12

D. Time will be the time the sample was collected, using military time.

   Example: 14:30

E. The sampler's name will be printed in the "Sampled By" section.

An example sample label is presented below:

Job No:	XXXXXXXXX
Client:	Name
Sample No:	SS-01
Matrix:	Soil Vapor
Date Taken:	3/22/12
Time Taken:	14:30
Sampler:	B. Smith
Analysis:	TO-15

Job No._____
Client:_____
Sample Number_____
Date_____ Sample Time _____
Sample Matrix_____
Grab or Composite (explain)_____
Preservatives_____
Analyses_____
Sampler Signature_____

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing from the field personnel collecting samples or the QEP.

5.2 SAMPLE CUSTODY

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

A sample or evidence file is considered to be under a person's custody if:

- the item is in the actual possession of a person
- the item is in the view of the person after being in actual possession of the person
- the item was in the actual physical possession of the person but is locked up to prevent tampering
- the item is in a designated and identified secure area

5.2.1 Field Custody Procedures

Samples will be collected following the sampling procedures documented in **Section 4.0** of this Plan. Documentation of sample collection is described in **Section 5.1** of this Plan. Sample chain-of-custody and packaging procedures are summarized below. These procedures are intended to ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All canisters will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in **Section 5.1.3** of this Plan.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. If third party commercial carriers are used for transfer to the laboratory, shipping containers will be secured with strapping tape and custody seals prior to shipment. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by third party commercial carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory courier or sample custodian, and signature of the laboratory courier or sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

5.2.2 Laboratory Custody Procedures

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will

- Examine the shipping containers to verify that the custody tape is intact,

- Examine all sample containers for damage,

- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody records,

- Compare samples received against those listed on the chain-of-custody,

- Verify that sample holding times have not been exceeded,

- Examine all shipping records for accuracy and completeness,

- Determine sample pH (if applicable) and record on chain-of-custody forms,

- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,

- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting the QEP,

- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The Laboratory Project Manager will be notified of sample arrival.
- The completed chain-of-custody, air bills, and any additional documentation will be placed in the final evidence file.

6.0 CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

Field instruments will be calibrated according to the manufacturer's specifications. Calibration procedures performed will be documented in the field logbook and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which the readings were taken, and the readings.

6.2 LABORATORY INSTRUMENTS

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's standard operating procedures (SOPs), which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. These procedures are as required in the respective analytical methodologies (summarized in **Table 2** of this Plan). The initial calibration associated with all analyses must contain a low-level calibration standard which is less than or equal to the quantitation limit.

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

No field analyses are anticipated for this program. If site conditions were to warrant field analysis, the responsible contractor will prepare an addendum establishing the field analytical procedures. Analyses of all samples will be performed by NYSDOH ELAP certified laboratories. **Table 2** summarizes the analytical methods to be used during the remediation.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

Appropriate QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project. Complete data packages suitable for data validation will be provided by the analytical laboratory.

For all analyses, the laboratory will report results that are below the laboratory's reporting limit; these results will be qualified as estimated (J) by the laboratory. The laboratory may be required to report tentatively identified compounds (TICs) for the VOC and SVOC analyses; this will be requested by the sampler on an as-needed basis. A Data Usability Summary Report (DUSR) will be prepared and will be included in the subsequent reports.

8.1 DATA EVALUATION/VALIDATION

8.1.1 Field Data Evaluation

Measurements and sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Daily reviews of the field records by the Field Team Leader will ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the Plan, and that any deviations were documented and approved by the appropriate personnel.

8.1.2 Data Usability

A Data Usability Summary Report (DUSR) will be prepared in accordance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

The data usability evaluation will include reviewing the quality assurance/quality control (QA/QC) information including: (1) chain-of-custody; (2) the summary QA/QC information provided by the laboratory; and (3) the project narrative.

For each data package the following questions will be evaluated:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B, USEPA CLP deliverables or other standards/guidance?
- Have all holding times and preservation requirements been met?
- Do the quality control (QC) data fall within the laboratory and project established limits and specifications?

8.2 IDENTIFICATION AND TREATMENT OF OUTLIER

Any data point which deviates markedly from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data set. One or both of the following tests will be used to identify outliers.

Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data. The one tailed t test for difference may also be used in this case. It should be noted that these tests are designed for testing a single value. If more than one outlier is suspected in the same data set, other statistical sources may be consulted and the most appropriate test of hypothesis will be used and documented, if warranted.

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier. Further statistical analysis may be performed with and without the outlier to determine its effect on the conclusions. In many cases, two data sets may be reported, one including, and one excluding the outlier.

In summary, every effort will be made to include the outlying values in the reported data. If the value is rejected, it will be identified as an outlier, reported with its data set and its omission noted.

9.0 INTERNAL QUALITY CONTROL

The subcontracting laboratories' Quality Assurance Project Plans will identify the supplemental internal analytical quality control procedures to be used. At a minimum, this will include:

- Laboratory control samples
- Instrument calibrations
- Instrument tunes for SW-846 8260B and 8270C and EPA Method TO-15 analyses
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for EPA Method TO-15 analyses
- Quantitation limit determination and confirmation by analysis of low-level calibration standard

Field quality control samples will include:

- Field duplicate samples as outlined in **Table 3**

10.0 CORRECTIVE ACTION

The entire sampling program will be under the direction of the QEP. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data-collection-laboratory-analysis-interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not totally effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in the Plan. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the Program Manager. The corrective action will usually involve recalculation, reanalysis, or resampling.

10.1 IMMEDIATE CORRECTIVE ACTION

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader will approve the corrective action and notify the Program Manager. The Program Manager will approve the corrective measure. The Field Team Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field logbook. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals

No staff member will initiate corrective action without prior communication of findings through the proper channels.

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, omissions or discrepancies with chain-of-custody documentation, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. The laboratory SOPs specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc.

The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA Manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, the QEP will be notified. The QEP will notify the Program Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to the Program Manager. If the corrective action does not rectify the situation, the laboratory will contact the Program Manager, who will determine the action to be taken and inform the appropriate personnel.

If potential problems are not solved as an immediate corrective action, the contractor will apply formalized long-term corrective action, if necessary.

Tables

TABLE 1

SOIL VAPOR CRITERIA TABLE

Quality Assurance Project Plan - Building 330C and 338 Air Sampling

2070 Route 52

Hopewell Junction, New York 12533

Volatile Organics Compounds in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria[1]				Toxicity[2]	Decision Matrix[3]
		1	2	3	4		A, B or C
1,1,1-Trichloroethane	71556	2.5	20.6	-	-	L	B
1,1,2,2-Tetrachloroethane	79345	0.4	-	-	-	M	TD
1,1,2-Trichloroethane	79005	0.4	<1.5	-	-	H	TD
1,1-Dichloroethane	75343	0.4	<0.7	-	-	L	TD
1,1-Dichloroethene	75354	0.4	<1.4	-	-	M	A
1,2,4-Trichlorobenzene	120821	0.5	<6.8	-	-	NA	TD
1,2,4-Trimethylbenzene	95636	9.8	9.5	-	-	NA	TD
1,2-Dibromoethane	106934	0.4	<1.5	-	-	H	TD
1,2-Dichlorobenzene	95501	0.5	<1.2	-	-	M	TD
1,2-Dichloroethane	107062	0.4	<0.9	-	-	H	TD
1,2-Dichloropropane	78875	0.4	<1.6	-	-	M	TD
1,3,5-Trimethybenzene	108678	3.9	3.7	-	-	M	TD
1,3-Butadiene	106990	-	<3.0	-	-	H	TD
1,3-Dichlorobenzene	541731	0.5	<2.4	-	-	M	TD
1,4-Dichlorobenzene	106467	1.2	5.5	344	-	M	TD
1,4-Dioxane	123911	-	-	-	-	M	TD
2,2,4-Trimethylpentane	540841	5	-	-	-	M	TD
2-Butanone	78933	16	12	-	-	M	TD
2-Hexanone	591786	-	-	-	-	NA	TD
3-Chloropropene	107051	-	-	-	-	M	TD
4-Ethyltoluene	622968	-	3.6	-	-	NA	TD
4-Methyl-2-pentanone	108101	1.9	6	-	-	M	TD
Acetone	67641	115	98.9	45.8	-	L	TD
Benzene	71432	13	9.4	10	-	H	TD
Benzyl chloride	100447	-	<6.8	-	-	H	TD
Bromodichloromethane	75274	-	-	-	-	M	TD
Bromoform	75252	-	-	-	-	M	TD
Bromomethane	74839	0.5	<1.7	-	-	M	TD
Carbon disulfide	75150	-	4.2	-	-	M	TD
Carbon tetrachloride	56235	1.3	<1.3	1.1	-	H	A
Chlorobenzene	108907	0.4	<0.9	-	-	M	TD
Chloroethane	75003	0.4	<1.1	-	-	L	TD
Chloroform	67663	1.2	1.1	6.34	-	H	TD
Chloromethane	74873	4.2	3.7	-	-	M	TD
cis-1,2-Dichloroethene	156592	0.4	<1.9	-	-	M	A
cis-1,3-Dichloropropene	10061015	0.4	<2.3	-	-	NA	TD
Cyclohexane	110827	6.3	-	-	-	L	TD
Dibromochloromethane	124481	-	-	-	-	NA	TD

TABLE 1

SOIL VAPOR CRITERIA TABLE

Quality Assurance Project Plan - Building 330C and 338 Air Sampling

2070 Route 52

Hopewell Junction, New York 12533

Volatile Organics Compounds in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria[1]				Toxicity[2]	Decision Matrix[3]
		1	2	3	4		A, B or C
Dichlorodifluoromethane	75718	10	16.5	-	-	NA	TD
Ethanol	64175	1300	210	-	-	L	TD
Ethyl Acetate	141786	-	5.4	-	-	M	TD
Ethylbenzene	100414	6.4	5.7	7.62	-	M	TD
Freon-113	76131	2.5	3.5	-	-	L	TD
Freon-114	76142	0.4	<6.8	-	-	NA	TD
Heptane	142825	18	-	-	-	M	TD
Hexachlorobutadiene	87683	0.5	<6.8	-	-	M	TD
Isopropanol	67630	-	-	-	-	M	TD
Methyl tert butyl ether	1634044	14	11.5	36	-	M	TD
Methylene chloride	75092	16	10	7.5	60	NA	B
n-Hexane	110543	14	10.2	-	-	M	TD
o-Xylene	95476	7.1	7.9	7.24	-	M	TD
p/m-Xylene	179601231	11	22.2	22.2	-	M	TD
Styrene	100-42-5	1.4	1.9	5.13	-	M	TD
Tertiary butyl Alcohol	75-65-0	-	-	-	-	NA	TD
Tetrachloroethene (PCE)	127184	2.5	15.9	6.01	30	H	B
Tetrahydrofuran	109999	0.8	-	-	-	M	TD
Toluene	108883	57	43	39.8	-	L	TD
trans-1,2-Dichloroethene	156605	-	-	-	-	NA	TD
trans-1,3-Dichloropropene	10061026	NC	<1.3	-	-	NA	TD
Trichloroethene	79016	0.5	4.2	1.36	2	H	A
Trichlorofluoromethane	75694	12	18.1	-	-	L	TD
Vinyl bromide	593602	-	-	-	-	H	TD
Vinyl chloride	75014	0.4	<1.9	-	-	H	C

Notes:

[1] NYSDOH Soil Vapor Intrusion Guidance Criteria (October 2006):

1: Table C-1 2003 Upper Fence Study of Volatile Organic Chemicals in air of Fuel Oil Heated Homes for Indoor Air

2: Table C-2 2001 USEPA BASE 90th Percentile for Indoor Air

3: Table C-5 2005 Health Effects Institute 95th Percentile for Indoor Air

4: NYSDOH Air Guidance Value (AGV)

[2] Toxicities from DAR-1 Appendix C/SCG/ACG

(H) HIGH Toxicity Contaminant.

(M) MODERATE Toxicity Contaminant.

(L) LOW Toxicity Contaminant.

[3] NYSDOH Soil Vapor Intrusion Decision Matrices (Updated May 2017)

Acronyms:

CAS - Chemical Abstracts Service

NA - Not applicable

TABLE 1

SOIL VAPOR CRITERIA TABLE

Quality Assurance Project Plan - Building 330C and 338 Air Sampling

2070 Route 52

Hopewell Junction, New York 12533

Volatile Organics Compounds in Air	CAS No.	NYSDOH Soil Vapor Intrusion Guidance Criteria[1]				Toxicity[2]	Decision Matrix[3]
		1	2	3	4		A, B or C

ND - Non-detect

NYSDOH - New York State Department of Health

TD - To be determined based on the NYSDOH Decision Matrices (Updated May 2017)

TABLE 2

ANALYTICAL PARAMETERS, METHODS, PRESERVATION, HOLDING TIME AND CONTAINER REQUIREMENTS

Quality Assurance Project Plan - Building 330C and 338 Air Sampling

2070 Route 52

Hopewell Junction, NY 12533

Sample Matrix	Analytical Parameters	Sample Type	No. of Samples[1]	EPA Analytical Method	Sample Preservation	Holding Time[2]	Sample Container
Soil Gas	VOCs	Grab	TBD	EPA Method TO-15	None	14 days to analysis	(1) Evacuated 6-Liter SUMMA® canister

Notes:

[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations. See Sloop Brewery SSDS Pilot Test Work Plan and Building 338 SVI Work Pan for estimates.

[2] Holding times listed are method holding time calculated from time of collection and not NYSDEC ASP holding times.

Acronyms:

EPA - Environmental Protection Agency

VOC - Volatile Organic Compound

TBD - To Be Determined

TABLE 3

TYPICAL LABORATORY DATA QUALITY OBJECTIVES

Quality Assurance Project Plan - Building 330C and 338 Air Sampling

2070 Route 52

Hopewell Junction, NY 12533

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs	EPA Method TO-15	Soil Gas	Surrogates % Rec.	Surrogates:	Matrix Duplicates	Matrix Duplicates
			4-Bromofluorobenzene 78-124	All samples, standards, QC samples	RPD £30	One per 20

Acronyms:

EPA - Environmental Protection Agency

RPD - Relative percent difference

VOC - Volatile Organic Compound

GZA GeoEnvironmental, Inc.