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FULL SCALE SUB-SLAB DEPRESSURIZATION (SSD) SYSTEM DESIGN REPORT – SLOOP BREWERY

i.PARK84, LLC
Former IBM East Fishkill Facility
2070 Route 52
Hopewell Junction, NY
NYSDEC SITE NO. 314054
EPA ID No. NYD000707901

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CERTIFICATION

I, Ernest R. Hanna, certify that I am currently a registered professional engineer licensed by the State of New York and that this Sub-Slab System Depressurization Design Report was prepared in accordance with applicable statutes and regulations, in substantial conformance with DER Technical Guidance for Site Investigation and Remediation (DER-10), and that all activities were performed in accordance with the DER-approved work plan and any DER-approved modifications. I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

Ernest R. Hanna, P.E.

Name

065440-1 August 13, 2019

NYS Professional Engineer # Date Signature

1.0 INTRODUCTION

GZA GeoEnvironmental of New York (GZA) prepared this Full Scale Sub-slab Depressurization (SSD) System Design Report (Design Report) on behalf of i.park84, LLC to discuss the results of the SSD system pilot test and the full scale SSD system design for the Sloop Brewery area inside Building 330C of the Former IBM East Fishkill Facility (Site) located at 2070 Route 52, Hopewell Junction, NY. The SSD pilot test activities were conducted in accordance with the New York State Department of Environmental Conservation- (NYSDEC-) approved Sub-Slab Depressurization System Pilot Test Work Plan – Sloop Brewery, dated May 16, 2019 (GZA 2019; Work Plan) except where noted.

A portion of the Former IBM East Fishkill Facility (Facility) is currently owned by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park). The entire 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 Design Report and surrounding areas. 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 and i.park have conducted soil/sub-slab vapor and indoor air quality assessments in the Sloop Brewery portion of Building 330C. During those assessments, cVOCs were identified in the sub-slab vapor samples. As a result, NYSDEC requested that i.park install a SSD system in the Sloop Brewery area.

2.0 BACKGROUND INFORMATION

The Former IBM East Fishkill 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 and i.park I in 2017. At the time of the sale, the Facility was divided into lots 1-8, with lots 1 and 5 retained by Global, and the remaining lots (2-4, and 6-8) sold to i.park. At the time of the sale, Facility building numbers were changed at the request of the Hopewell Junction Township. All references to building numbers in this report reflect the historical building numbers; however, a 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 New York State Department of Health (NYSDOH; both referred to as 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 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 volatile organic compounds (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 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 measured. 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 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 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 an SSD system beneath the slab of the Sloop Brewery area in a letter to Walden dated February 1, 2019.

In April 2019, GZA, on behalf of i.park, conducted a pilot study to design an SSD system for the Sloop Brewery area. The procedures and results of the pilot test are discussed below.

5.0 SSD SYSTEM PILOT TEST

The SSD system pilot test was conducted to obtain design parameters for a full scale SSD system capable of mitigating soil vapor intrusion within the Sloop Brewery. The pilot test was also necessary to determine a more efficient sub-slab vapor extraction point spacing within the Site, and to establish an approximate radius of influence (ROI) for sub-slab vapor extraction points. The SSD system pilot test was conducted between April 29 and May 1,

2019 at two vertical sub-slab vapor extraction points (VEPs; GZA-EP-1 and GZA-EP-2) and seven vapor assessment points (VPs; VP-1 through VP-7), which were installed in two different areas of Sloop Brewery. **Figure 2** depicts the locations of the VEPs and VPs installed during the pilot test. During the pilot test, one air sample (SV-001) was collected from GZA-EP-1 along with a co-located indoor air sample and two ambient air samples (upgradient and downgradient) in order to evaluate the presence and extent of VOCs below the floor slab and to determine if vapor treatment is required during the full-scale SSD system operations. The following sections describe the SSD system pilot test results and evaluation of design parameters for the full scale SSD system.

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

In accordance, with the NYSDEC-approved Work Plan (GZA 2019: Work Plan), GZA proposed to install one vapor extraction point VEP-1 and four vapor assessment points VP-1 through VP-4, and use the existing vapor extraction points (EP3004, SS3024 through SS3026, SS3047 and SS3049) to conduct the pilot test. Following the submission and acceptance of the Work Plan by the NYSDEC, GZA was notified that the proposed locations of VEP-1 and VP-1 through VP-4 were in the vicinity of newly installed trench drains, and accessibility to the existing points would be difficult. As a result, GZA updated the location of the vapor extraction/assessment points and submitted a revised figure to the NYSDEC on April 24, 2019. The revised figure included the installation of three vapor assessment points VP 5, 6, & 7 around EP3004. In addition, installation of one vapor extraction point VEP-2 and four vapor assessment point VP-1 through VP-4 on the western portion of the Site. The revised Figure also included the installation of VEP-1 and associated VPs in the same location, in order to evaluate the effect of the trench drains on the sub-slab airflow and heterogeneity underneath the slab.

During the VEP/VP installations, GZA could not locate EP3004 and found brewing vessels in the vicinity of the proposed location of VEP-1. GZA attempted to relocate VEP-1 in the vicinity of the proposed location; however, due to obstructions and access issues, VEP-1 was unable to be re-located within the Brewing Area. GZA installed VEP-2 in the Tasting Room as per the proposed plan and it is renamed as GZA-EP-1. Since, EP3004 was not accessible VEP (GZA-EP-2) was installed in the vicinity of EP3004 to conduct the pilot test.

On April 29, 2019, Ground Penetrating Radar Systems, Inc. of New York (GPRS), under contract to GZA, performed a geophysical survey at the Site. The purpose of the survey was to locate and identify utilities and/or substructures within the proposed VEP and VP locations. GPRS utilized a 400 megahertz (MHz) ground penetrating radar (GPR) with a shielded antenna and a RD 7000 Radio frequency detector utility locator. GPRS cleared and marked the proposed VEP and VP locations at the time of the survey, and traced utilities in the areas surveyed. Additionally, prior to invasive work, the GZA drilling subcontractor contacted New York 811 and requested a utility mark out to locate underground utilities on the exterior of the Site leading into the Site building.

A two-inch VEP (GZA-EP-1) was installed within the Tasting Room. GZA-EP-1 was constructed by coring a 3-inch diameter hole through the concrete floor slab and installing a two-inch-diameter by approximately 1.5-feet-long 20-slot schedule 40 PVC screen equipped with a capped port flush with the floor. The VEP was installed to extend approximately 12-inches below the slab. Four VPs (VP-1 through VP-4) were installed at varying distances (approximately 5, 10, 20 and 23 feet, respectively) from GZA-EP-1 in the Tasting Room.

GZA installed GZA-EP-2 within the Packing Area. GZA-EP-2 was constructed by coring a 1-inch diameter hole through the concrete floor slab and installing a 0.75-inch-diameter by approximately 1.5-feet-long schedule 40 PVC screen equipped with a capped port flush with the floor. Three VPs (VP-5 through VP-7) were installed at varying distances (approximately 5, 15, and 20 feet, respectively) from GZA-EP-2 in the Packing Area.

The seven VPs installed were constructed by coring the concrete floor slab and installing a 5/8-inch diameter by approximately 3-inch long Vapor Pin®. The Vapor Pin® is self-sealing and it was equipped with a capped port flush with the floor to obtain an air-tight seal. The hole through the concrete extended approximately three inches below the slab and the annular space around the vapor pin was sealed with silicone. A schematic of the VP is shown on **Figure 4**. Helium integrity testing was performed on the VPs following installation to confirm air-tight seals around the slab penetration.

5.2 SSD SYSTEM PILOT TEST EQUIPMENT

A portable blower with a maximum capacity of generating 35 inches of water (IW) vacuum and an air flow rate of 74 cubic feet per minute (cfm) was mobilized to the Site. The blower was connected to the VEP by a manifold, constructed with two-inch diameter Schedule 40 PVC pipe, equipped with ports to measure flow, velocity, vacuum, and to collect sub-slab vapor samples. Ball valves were installed to control the flow and vacuum. Connection details are provided in the Work Plan. A bead of putty was applied around the perimeter of the two-inch pipe fittings to ensure a tight connection. A TSI Velocity calc 9515 was used to measure air velocity and temperature. Induced and applied vacuum readings were collected from the VEPs and VPs using calibrated magnehelic gauges and appropriate piping adaptors.

5.3 SYSTEM SHAKEDOWN, STEP TESTS, AND LONG-TERM TEST

An initial system shakedown was completed prior to initiating the pilot test to assess the range of system operational settings (anticipated airflow and vacuums). **Table 2** includes a checklist of items that were completed during the system commissioning and shakedown test.

Three step tests and one long-term test were conducted in the Tasting Room (GZA-EP-1) and Packing Area (GZA-EP-2). The HVAC system within the Sloop Brewery was operating at its routine condition during the pilot test, with system settings typical for the date and weather conditions suitable for workers within the facility. The three step tests in the Tasting Room (GZA-EP-1) were conducted with flow rates of approximately 10, 20 and 45 cfm. The three step tests in the Packing Area (GZA-EP-2) were conducted with flow rates of approximately 10, 20 and 35 cfm. Each step test was run for approximately one hour. The long-term test was conducted for approximately 1.5 hours at each VEP. There were no breaks between the step tests and long-term tests.

The VEP was connected to the blower using the manifold as presented in the Work Plan. The dilution and the manifold valves were used for controlling flow and vacuums at the VEP. During the step test the following parameters were collected:

- Applied vacuum at the VEP (IW);
- Induced vacuum at the VPs[1] (IW)
- Flow at the VEP (cfm)[2];
- Vacuum at the VEP, before the blower (IW);

[1] Induced vacuum is a measurement of the differential pressure, from atmospheric conditions to those in the subsurface at the VP, caused by the application of a negative pressure at the VEP.

[2] Flow rate was estimated using the velocity of the air flow and the manifold pipe diameter of 2 inch.

- VOC readings using photo-ionization detector (PID) at the VEP and VPs (ppm);
- Air samples from one VEP (GZA-VEP-1), a co-located indoor air sample, and upgradient and downgradient ambient air samples for VOC analysis (TO-15 analysis).

The specific operations conducted, and observations noted during each part of the step and long-term tests are discussed below. The readings were used in the estimation of the VEP ROI. Induced vacuum readings and PID readings from the VPs are presented in **Table 3**. Log sheets for the system readings collected during operation are also presented in **Table 3.**

5.3.1 Tasting Room (GZA-EP-1)

The first step test was started at approximately 45 cfm. During operation it was found that flow rates fluctuated from 44 to 47 cfm at an average of 45 cfm for approximately one hour with an average applied vacuum of 12.8 IW. Induced vacuum readings collected at the VPs ranged from 0.013 IW to 0.084 IW.

The second step test was conducted at an average flow rate of 22 cfm for approximately one hour with an average applied vacuum of 5 IW. Induced vacuum readings collected at the VPs ranged from 0.005 IW to 0.028 IW.

The third and final step test was conducted at an average flow rate of 11 cfm for approximately one hour with an average applied vacuum of 2 IW. Induced vacuum readings collected at the VPs ranged from 0.004 IW to 0.010 IW.

The flow rate for the long-term test was selected after reviewing the step test data and determining which step indicated stable readings for vacuum, flow, and induced vacuum which would be optimal for the SSD system. The long-term test was performed for approximately 1.5 hours at an average flow rate of approximately 46 cfm with an average applied vacuum of 16 IW. Induced vacuum readings collected at the VPs ranged from 0.01 IW to 0.06 IW.

During the pilot test, one air sample (SV-001) was collected from GZA-EP-1 through a sampling port. The sample was collected at 28 cfm and an applied vacuum of 29.5 IW. A co-located indoor air sample and two ambient air samples (upgradient and downgradient) were also collected during the pilot test. Air samples were collected in six-liter Summa canisters using flow regulators calibrated for a 30-minute collection time. Air samples were analyzed by Alpha Analytical via U.S. Environmental Protection Agency (EPA) method TO-15.

5.3.2 Packing Area (GZA-EP-2)

The first step test was started at an average flow rate of 37 cfm for approximately one hour with an average applied vacuum of 36.5 IW. Induced vacuum readings collected at the VPs ranged from 0.020 IW to 0.058 IW.

The second step test was conducted at an average flow rate of 20.4 cfm for approximately one hour with an average applied vacuum of 23 IW. Induced vacuum readings collected at the VPs ranged from 0.018 IW to 0.058 IW.

The third and final step test was conducted at an average flow rate of 9.3 cfm for approximately one hour with an average applied vacuum of 4 IW. Induced vacuum readings collected at the VPs ranged from 0.005 IW to 0.015 IW.

The flow rate for the long-term test was selected after reviewing the step test data and determining which step indicated stable readings for vacuum, flow, and induced vacuum which would be optimal for the SSD system. The long-term test was performed at an average flow rate of approximately 37.8 cfm for approximately 1.5 hours with

an average applied vacuum of 31.3 IW. Induced vacuum readings collected at the VPs ranged from 0.020 IW to 0.060 IW.

6.0 DATA ANALYSIS

6.1 VACUUM AND AIRFLOW RATE ANALYSIS

During the pilot test, the blower was operated at three different vacuum and flow settings at VEP GZA-EP-1 and GZA-EP-2, shown in the table below:

GZA-EP-1		GZA-EP-2	
Flow (CFM)	**Applied Vacuum (IW)**	**Flow (CFM)**	**Applied Vacuum (IW)**
45	13	37	36.5
22	5	20.4	23
11	2	9.3	4

The applied vacuum and flow rates were graphed, and a "best" fit approximation was determined for this relationship. The "best" fit was generated using a quadratic regression analysis. The relationship was used to determine optimal flow rate at an optimal vacuum setting. The results are presented in **Appendix A**.

6.2 INDUCED VACUUM ANALYSIS AND RADIUS OF INFLUENCE

The induced vacuum readings were used to estimate the ROI at both GZA-EP-1 and GZA-EP-2. Observations of induced vacuum and distance from the VEPs were used to establish an empirical relationship to predict the ROI at different applied vacuums. The relationship between induced vacuum and distance was more accurately established by plotting the distance versus the log of the vacuum readings and the log of the distance versus the vacuum readings. An induced vacuum value of 0.004 IW was used as the threshold to define the ROI at each VEP. The "best" fit ROI values obtained from each step test was used to compare it with the applied vacuum. The ROI versus applied vacuum relationship was applied to a quadratic curve to determine a maximum/optimal applied vacuum and ROI. The applied vacuum versus flow rate relationship was applied to a quadratic curve to determine a maximum/optimal flow rate. The optimum ROI applied vacuum, flow rate and step test ROI calculations are presented in **Appendix A**.

The evaluation of the pilot test data indicates that an effective ROI of 26 feet at an applied vacuum of 3.3 IW and flow rate of 15.8 cfm was observed at GZA-EP-1, which is located on the west side of the Site. Similarly, an effective ROI of 17 feet at an applied vacuum of 3.2 IW and flow rate of 9 cfm was observed at GZA-EP-2, which is located on the east side of the Site. Based upon these findings, the subsurface conditions on the eastern side of the Site appear to differ from those on western side of the Site. Therefore, the sub-slab air flow / air permeability differs, with lower connectivity on the east side.

6.3 VOC AIR SAMPLE RESULTS

The results of the air sample (SV-001), indoor air sample and two ambient air samples (upgradient and downgradient) are presented in **Table 4**. This data was used to evaluate the presence and extent of VOCs beneath the floor slab/within the Sloop Brewery and if the extracted vapors during the full-scale SSD system operations would require treatment before discharging it into the atmosphere.

The primary constituent identified in SV-001 was PCE at concentration of 69.2 µg/m^3. The results of the indoor air sample (IA-001) were compared to Table C-1 2003 Upper Fence Study of Volatile Organic Chemicals in air of Fuel Oil Heated Homes for Indoor Air, Table C-2 2001 USEPA BASE 90th Percentile for Indoor Air, and Table C-5 2005 Health Effects Institute 95th Percentile for Indoor Air. The indoor air sample results indicated no exceedances of any of the background constituent values that were analyzed.

The results of the VEP air sample (SV-001) and the indoor air sample (IA-001) were compared against the NYSDOH Vapor Intrusion Decision Matrices A, B, and C. No further action was recommended by Matrices A, B and C based on the data collected during the pilot test.

The sub-slab sample SV-001 was also evaluated for its toxicity and impacts on the receptors downwind using a dispersion model (AERSCREEN). AERSCREEN is a screening model based on the U.S. EPA AERMOD air quality dispersion model to predict ambient air concentrations attributed to a single source. The input parameters including total VOC concentrations, effluent loading rates, stack height, flow rates, velocity and the distance to the receptor (3 feet) were entered into the NYSDEC DAR Air Guidance (AR)-1 Guidelines for the Control of Toxic Ambient Air Contaminants, AERSCREEN computer program (**Table 5**). A maximum concentration for the air stream collected at 28 cfm was estimated using the AERSCREEN model. This concentration was compared with Short-term Guideline Concentrations (SGCs) and Average-Annual Guidance Criteria (AGCs). The sub-slab sample SV-001 results did not exceed the concentration values for contaminants of concern listed within the SGC and AGC values (**Table 6**). The AERSCREEN computer model was updated using the sub-slab SV-001 results and the design flow rate of 524 cfm (**Table 5a**) and the output from the model did not exceed the AGC (**Table 6a**). The laboratory package is included in **Appendix B**. The sub-slab sample SV-001 results indicate that the levels are acceptable for discharge to the atmosphere without any vapor control during the full scale SSD system operations.

7.0 FULL SCALE SSD SYSTEM DESIGN

This SSD system design presented herein is proposed to generally depressurize the entire footprint of the Sloop Brewery area and will be operated separately from the Building 330C SSD system. The current plan shows small gaps (on the order of two to five feet) in between the theoretical ROI for a few of the extraction points. The locations available for installation of the extraction points was limited due to the current layout of utilities and other equipment inside the building. GZA optimized the extraction point layout in consideration of the ROI and available installation locations. The proposed extraction points are considered suitable enough to depressurize the entire footprint of the Sloop Brewery as the theoretical ROI is based on our conservative assumptions and includes a safety factor. GZA will collect induced vacuum readings from the VPs to confirm a suitable vacuum is present underneath the building slab.

The design parameters required to develop a full scale SSD system have been developed based on the pilot test results. The pertinent design parameters include:

- ROI for the SSD system VEPs;
- Locations of VEPs;
- Locations of additional VPs;
- Optimal target soil vapor flow rate; and
- Optimal target applied vacuum.

7.1 VEP LAYOUT

The treatment zone has an area of approximately 36,000 square feet, which includes the entire footprint of the Sloop Brewery. The depth to the bottom of treatment zone, considered at the bottom of the prepared sub-grade, is assumed to be at about 1.5 ft from the bottom of the concrete slab. Thus, the average volume of the treatment zone was estimated to be less than 54,000 cubic feet. Assuming a porosity of 0.35, the average soil pore (gas) volume within the treatment zone is estimated to be 18,900 cubic feet.

Based upon the observations and findings from the pilot study it appears that the connectivity underneath the slab on the western and central portions is higher than the eastern portion of the Site. Therefore, a higher ROI of 35 feet was used for placing the VEPs on the western and the central portion of the Site, and a ROI of 30 feet was used for placing the VEPs on the eastern portion of the Site. The SSD system will include 18 VEPs (SP-1 through SP-18) that are designed to generate a minimum vacuum of 0.004 IW across the treatment area.

Ten VEPs (SP-1 through SP-10) will be installed on the western and central portions of the Site. Using an ROI of 35 feet, and based upon accessibility, the locations of the VEPs on the western and central portions of the Site were chosen to provide sufficient spatial coverage with overlap. VEP locations are identified on **Figure 3**. The final locations will be confirmed upon installation of these points and changes will be recorded on the record drawings submitted following installation. With a calculated ROI of 35 feet, each VEP will have an anticipated area of influence of approximately 3,848 square feet. Based on the linear and quadratic regression analysis from the pilot test data for GZA-EP-1, design values of applied vacuum of 10 IW and flow rate of 39 CFM per VEP are set as target values. To achieve target values, the 10 VEPs will be operated by two blowers with a combined flow of 392 cfm at 12 IW of vacuum. Refer to **Table 7** for the details on operational flows, vacuums and distribution of the VEPs. **Figure 3** depicts the approximate ROI for each VEP.

Eight VEPs (designated as SP-11 through SP-18) will be installed on the eastern portion of the Site. Using an ROI of 30 feet, and based upon accessibility, the locations of the VEPs on the eastern portion of the Site were chosen to provide sufficient spatial coverage with overlap. VEP locations are identified on **Figure 3**. The final locations will be confirmed upon installation of these points and changes will be recorded on the record drawings. With a calculated ROI of 30 feet, each VEP will have an anticipated area of influence of approximately 2,827 square feet. Based on the linear and quadratic regression analysis from the pilot test data for GZA-EP-2, design values of applied vacuum of 19 IW and flow rate of 16.5 CFM per VEP are set as target values. To achieve target values, the 8 VEPs will be operated by two blowers with a combined flow of 132 cfm at 20 IW of vacuum. Refer to **Table 7** for the details on operational flows, vacuums and distribution of the VEPs. **Figure 3** depicts the approximate ROI for each VEP.

In addition to the existing VPs (VP-1 through VP-7) installed during the pilot test, nine additional VPs (VP-8 through VP-16) will be installed to confirm a minimum vacuum of 0.004 IW across the treatment area.

7.1.1 Pore Volume Removal Rates

The SSD system design is based on the pressure influence ROI approach, rather than the pore volume approach. As discussed above, the treatment zone has an area of approximately 36,000 square feet. and a treatment thickness of 1.5 feet, thus the treatment zone volume is estimated at 54,000 cubic feet. Assuming a porosity of 0.35, the average soil pore (gas) volume within the treatment zone is estimated to be 18,900 cubic feet.

The pore volume method was also examined as a secondary check on the system design and well coverage. By operating at a combined flow rate of 524 cfm, and a pore gas volume estimated at 18,900 cubic feet, an anticipated 40 pore volumes will be removed from the treatment zone per day with the continuous operation of the system. The 2002 U.S. Army Corps of Engineers (USACE) Soil Vapor Extraction (SVE) design manual recommends a typical pore volume removal, or exchange, of 10 per day to achieve rapid site closure. The pore volume and the pressure influence ROI approach both predicts a conservative and an expedited design approach.

7.2 SSD SYSTEM INSTALLATION

7.2.1 VEPs and Sub-Grade Piping

VEPs and sub-grade trenching will be installed as shown on the **Figure 4**. The VEP locations were chosen in part to keep the sub-grade trenching/piping to a minimum. For each VEP, an eight-inch diameter hole will be cored through the entire depth of the floor slab and material underneath the slab will be removed. A three to four-inch diameter Schedule 40 cast iron (CI) pipe will then be installed six inches below the bottom of the floor slab. The annular space will be filled with stone (see **Figure 4** for stone specifications), surface will be restored with concrete, and seams will be sealed with a sealant. The floor slab thickness ranges at the Site from 8 inches (west side) to 12 inches (east side).

All sub-grade horizontal pipe runs will be installed with a one-inch slope back to the VEP for each ten feet of horizontal pipe run. In no case will the piping be installed as to create a possible water trap in the piping. All sub-grade horizontal piping and fittings installed, unless otherwise noted or specified, shall be four-inch schedule 40 PVC pipe.

Material (e.g. concrete, subbase stone and fill/native soil material) generated from coring will be disposed at an appropriate disposal facility or relocated to the approved common solid waste collection facility located on-Site. All transportation will be completed in accordance with all applicable State and Federal regulations. Copies of manifests and/or bills-of-lading from the facility that received waste generated during the SSD system installation activities will be provided in the final report.

7.2.2 Vertical Riser and Header Pipes

Each VEP will be connected either directly, or via sub-grade horizontal piping to a 3 or a 4-inch diameter cast iron (CI) vertical riser (VR) pipe. All CI VR pipes will run vertically up an interior wall or I-beam to the interior ceiling level where it will be routed into a header pipe, which will be connected to the blower. The proposed locations of the header piping are shown on **Figure 3**. Due to the complexity of the Site building, the interior piping routes may need to be altered during installation of the system. A record drawing of the constructed pipe system will be provided following installation to show the final locations of the interior piping.

Sampling ports and ball valves will be installed on each VR to control and measure flow, velocity and vacuum at each VR during operations and maintenance (O&M) of the SSD system. **Figure 4** details the typical locations of the sampling ports and ball valves to be installed on the VR pipes.

Interior VR pipes will be identified as described below on all interior riser pipes beginning at the floor slab elevation and continuing to the installation of the exhaust vents above the roof. The lettering shall read: "CAUTION: DO NOT ALTER, SUBSURFACE VAPOR VENT PIPE, HEADER #".

The VRs will be combined into a total of four header lines at the interior ceiling level using either 3-inch or 4-inch CI pipe. Refer to **Figure 3** for a layout of VEPs to be combined on each header. All headers will penetrate upwards through the ceiling to the roof at a location to be determined during construction. A record drawing will be provided following installation to detail the final locations of the roof penetrations.

The header pipes will be routed on the roof to an individual blower. A record drawing will be provided following installation showing the final locations of the roof piping layout and blower locations. The SSD system will include a total of four blowers, one for each header pipe. The blower specifications are provided in **Appendix C.**

A magnehelic gauge (Dwyer Instruments Inc., or equivalent) will be installed at each header pipe just before the blower to indicate the static vacuum generated by each blower system. To the extent practicable, the range of the magnehelic will be selected so that the indicator needle is close to or just to the right of center on the dial face. The magnehelic will be enclosed in an Integra protective enclosure. The low pressure magnehelic port will be connected with 1/4" O.D. flexible aluminum tubing to each riser pipe. The aluminum tubing will arc to a higher elevation than where it exits the riser pipe before it is connected with the magnehelic. This will prevent condensation from running into the magnehelic or creating a water trap in the tube. The magnehelic will be mounted at eye level for easy reading. An audible and visual vacuum alarm will be installed on each header line. The alarm will be located in the interior of the Site building, in a commonly occupied area, in order to notify occupants via an audible indicator and a red light if there is a loss of system vacuum.

7.2.3 Discharge Stack

The discharge stacks will be installed on each blower and be located so that the discharge point is:

- Above the eave of the roof (preferably above the highest eave of the building at least 12 inches above that portion of the roof);
- At least 10 feet above roof deck level;
- At least 10 feet away from any opening that is less than 2 feet below the exhaust point; and
- At least 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

7.2.4 Sealing of Cracks and Joints

Any visible expansion joints or slab cracks in the Site building that have a 1/16 inch or greater opening will be sealed. Cracks will be cleaned with a walk behind rotary wheel device with a vacuum attachment to capture dust or debris. Cracks will be sealed with a gun-grade urethane caulk sealant. Any openings into the slab, such as those that may occur around conduit pipe penetrations through the slab, will be cleaned and sealed with gun-grade urethane caulk. Expansion joints that are greater than ¼ inch in width or greater than 3/8 inch below the floor surface may require the installation of backer rod and self-leveling urethane sealant. Areas where sealing has taken place shall display signage "WET CAULK, DO NOT STEP IN" and remain displayed until the sealants have cured.

7.3 OPERATION & MAINTENANCE AND PERFORMANCE MONITORING

7.3.1 Proposed Operation and Maintenance

Following the first week of system shake down and startup, GZA will shift the system to continuous operation and visit the Site once a week in the first month of operations. After the installation of the SSD system, GZA will collect vacuum readings from the SSD VEPs and the VPs. The following tasks will be conducted during routine weekly Site visits to assess the effectiveness of the system at achieving the design goals and maintaining a minimum sub-slab vacuum level of 0.004 IW:

- Collect system flow rates and operating vacuums;
- Collect effluent vapor concentration readings (using a hand-held PID) to assess vapor control efficiency;
- Monitor VPs to assess induced vacuum readings;
- Inspect VEPs and adjust the applied vacuum using valves.

Air samples will be collected from effluent sample ports for VOC analysis via EPA method TO-15 method analysis during the first and third week after commissioning the operations. The air samples will be sent to an Environmental Laboratory Approval Program (ELAP) certified laboratory. The air sample results will be compared with the respective AGC and SGC values and the AERSCREEN model will be updated to determine if a vapor control system is required.

An operation, monitoring and maintenance (OM&M) plan will be prepared and submitted to NYSDEC and NYSDOH with the Site Management Plan (SMP) or under a separate cover. The OM&M plan will include long-term performance monitoring to document a minimum sub-slab vacuum of 0.004 IW is being maintained, that equipment is operating as planned, and that a maintenance program and schedule is followed. GZA will coordinate with NYSDEC and i.park for establishing routine OM&M procedures.

8.0 INSTALLATION SUPPORT ACTIVITIES

8.1 UTILITY CLEARANCE

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

8.2 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 oversight activities during system installation (**Appendix D**).

8.3 COMMUNITY AIR MONITORING PROGRAM

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

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 VEP and VP installation locations.

An exclusion zone will be set up prior to full scale SSD system installation to maintain a minimum of 20 feet from exposed individuals (as per DER-10, Appendix 1A). VEP, VP and trenching installations will be the only activities associated with this work plan where there is a potential for dust to be generated. The VEP/VP construction and locations have been designed to keep concrete disturbance to a minimum. The proposed design includes minimal sub-grade trenching. All concrete disturbance activities will include the use of a negative-pressure enclosure equipped with a high efficiency particulate air (HEPA) filter or dust suppressants (e.g. water) to ensure that airborne dust generated during drilling activities is contained within the enclosure.

8.4 TENANT COMMUNICATION

After installation of the SSD system and concurrent with development of the OM&M plan, an information package will be prepared and provided to the tenant (Sloop Brewery). The information package will provide a description of the SSD system, a summary of the OM&M of the SSD system, how the tenant can confirm the system is operating properly, and contact information in case of system failure or other questions.. A copy of the tenant information package will be submitted to NYSDEC and NYSDOH.

9.0 REPORTING

A Construction Completion Report (CCR) will be prepared and submitted to NYSDEC and NYSDOH following installation of the SSD system, system shake down and startup, and completion of operation and maintenance during the first month of operations. The CCR will include a description of the SSD system as constructed, problems encountered, changes to the design documents and reason for such changes, quantities of materials disposed and the facility where such materials were disposed, data collected, and record drawings. The CCR will be stamped, certified and signed by a New York State licensed professional engineer.

10.0 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.

GZA GeoEnvironmental, Inc., May 2019, Sub-Slab Depressurization System Pilot Test Work Plan – Sloop Brewery, Former IBM East Fishkill Facility, 2070 Route 52, Hopewell Junction, NY.

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

Full Scale SSD System Design Report - Sloop Brewery

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

PILOT TEST SYSTEM START UP AND COMISSIONING CHECKLIST - SHAKEDOWN TEST
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Date: 4/29/2019
Person Performing Inspection: Ben Romagnoli, Phil Bosco

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

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 4/30/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-1
Test Start Time: 12:10
Test End Time 13:10

Test Phase: Step 1 - Main Full Open, No Dilution
Notes: In Tasting Room
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-001				VP-1		VP-2		VP-3		VP-4	
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID	VAC	PID
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm
12:10	0	12	0.0	1900	44	0.085	2.0	0.055	1.2	0.00	2.0	0.010	0.8
12:20	10	13	0.0	1960	46	0.080	1.3	0.045	1.1	0.00	2.2	0.010	0.8
12:30	20	13	0.5	1999	47	0.085	1.1	0.040	0.8	0.00	1.6	0.015	0.4
12:40	30	13	0.0	1940	45	0.085	0.8	0.045	0.5	0.00	1.7	0.015	0.5
12:50	40	13	0.0	1940	45	0.085	0.7	0.055	0.7	0.00	1.7	0.015	0.4
13:00	50	13	0.0	1928	45	0.085	0.6	0.055	0.6	0.00	1.5	0.015	0.4

Notes/Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute
Pipe ID: 2.067 inches
Pipe ID: 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 4/30/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-1
Test Start Time: 13:10
Test End Time 14:10

Test Phase: Step 2 - Main Valve 1/2 open, Dilution Valve 1/2 open
Notes: In Tasting Room
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-001				VP-1		VP-2		VP-3		VP-4	
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID	VAC	PID
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm
13:10	0	5	0.0	930	22	0.025	0.8	0.028	0.7	0.00	1.4	0.0075	0.4
13:20	10	5	0.0	940	22	0.030	0.8	0.025	0.9	0.00	1.3	0.0050	0.5
13:30	20	5	0.0	970	23	0.028	0.7	0.025	0.7	0.00	1.3	0.0050	0.5
13:40	30	5	0.0	950	22	0.028	0.7	0.025	0.8	0.00	1.4	0.0050	0.4
13:50	40	5	0.0	980	23	0.028	0.8	0.025	0.7	0.00	1.2	0.0050	0.5
14:00	50	5	0.0	950	22	0.030	0.8	0.020	0.7	0.00	1.3	0.0050	0.4

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 4/30/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-1
Test Start Time: 14:10
Test End Time 15:10

Test Phase: Step 3 - Main Valve 1/3 open
Notes: Dilution Valve 1/2 open
In Tasting Room
Using GZA PID for 3rd reading on

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-001				VP-1		VP-2		VP-3		VP-4	
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID	VAC	PID
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm
14:10	0	2	0.0	470	11	0.008	0.7	0.0125	0.9	0.00	1.5	0.005	0.4
14:20	10	2	0.0	470	11	0.013	0.8	0.0075	0.8	0.00	1.6	0.0025	0.5
14:30	20	2	0.0	470	11	0.010	0.8	0.0075	0.8	0.00	1.7	0.005	0.5
14:40	30	2	0.4	470	11	0.010	6.5	0.010	6.8	0.00	6.7	0.005	5.5
14:50	40	2	0.2	470	11	0.010	7.2	0.010	7.4	0.00	5.9	0.005	6.0
15:00	50	2	0.3	470	11	0.010	6.8	0.010	7.2	0.00	5.8	0.005	5.8

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 4/30/2019
Weather: Partly Cloudy, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-1
Test Start Time: 15:30
Test End Time 17:05

Test Phase: Long Term, Main Valve Fully Open, No Dilution Air
Notes: Ambient PID - 0.5 ppm
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-001				VP-1		VP-2		VP-3		VP-4	
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID	VAC	PID
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm	in-H20	ppm
15:30	0	16	0.0	1970	0	0.01	7.7	0.060	7.2	0.00	6.2	0.020	5.6
15:45	15	16	-	1980	0	0.01	-	0.060	-	0.00	-	0.020	-
16:00	30	16	1.0	1990	0	0.01	4.0	0.060	5.5	0.00	4.8	0.020	4.3
16:15	45	16	-	2000	0	0.01	-	0.060	-	0.00	-	0.020	-
16:30	60	16	0.0	2000	0	0.01	3.6	0.060	4.7	0.00	5.0	0.015	3.7
16:45	75	16	-	2000	0	0.01	-	0.060	-	0.00	-	0.020	-
17:00	90	16	0.0	2000	0	0.02	2.9	0.060	4.2	0.00	4.3	0.020	3.1

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Inner Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 5/1/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-2
Test Start Time: 8:30
Test End Time 9:30

Test Phase: Step 1 - Main Valve Full Open, No Dilution
Notes: Ambient PID: 0.8 - 1.2 ppm
*Vac too high for PID pump @extraction well
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-002				VP-5		VP-6		VP-7			
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID		
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm		
8:30	0	36	*	1590	37	0.055	1.8	0.020	2.4	0.015	3.2		
8:40	10	36	*	1590	37	0.060	1.6	0.020	1.9	0.02	3.2		
8:50	20	36	*	1590	37	0.058	1.6	0.025	1.8	0.02	3.2		
9:00	30	37	*	1590	37	0.058	1.5	0.020	1.8	0.0175	3.2		
9:10	40	37	*	1590	37	0.058	1.4	0.020	1.7	0.0175	3.3		
9:20	50	37	*	1590	37	0.058	1.3	0.020	1.8	0.02	3.1		

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 5/1/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-2
Test Start Time: 9:30
Test End Time 10:30

Test Phase: Step 2 - Main Valve 1/2 open
Notes: Dilution valve 1/2 open
Ambient PID: 0.8 ppm
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-002				VP-5		VP-6		VP-7			
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID		
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm		
9:30	0	24	0.6	860	20	0.0325	1.5	0.010	1.6	0.01	2.7		
9:40	10	23	0.6	860	20	0.030	1.4	0.010	1.6	0.01	2.8		
9:50	20	23	0.4	860	20	0.0325	1.2	0.010	1.3	0.01	2.4		
10:00	30	23	0.4	860	20	0.0350	1.3	0.010	1.3	0.01	2.6		
10:10	40	23	0.4	910	21	0.0350	1.1	0.010	1.2	0.01	2.4		
10:20	50	22	0.4	910	21	0.0350	1.1	0.010	1.2	0.01	2.1		

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Name: iPark84. LLC
Project Number: 12.0076252.10
Date: 5/1/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-2
Test Start Time: 10:30
Test End Time 11:30

Test Phase: Step 3 - Main Valve 1/3 open
Notes: Dilution valve >1/2 open
Ambient PID: 0.9 ppm
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-002				VP-5		VP-6		VP-7			
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID		
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm		
10:30	0	4.2	0.3	410	10	0.0150	1.0	0.005	1.2	0.0025	2.1		
10:40	10	4.2	0.2	410	10	0.010	0.9	0.005	1.2	0.0025	2.1		
10:50	20	4.0	0.2	390	9	0.0150	0.9	0.005	1.2	0.0025	2.1		
11:00	30	4.0	0.2	390	9	0.0150	1.1	0.005	1.2	0.0025	2.2		
11:10	40	4.0	0.1	390	9	0.0150	0.9	0.005	1.3	0.0025	2.1		
11:20	50	4.0	0.1	390	9	0.0150	0.8	0.005	1.0	0.0025	1.8		

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

Project Name: iPark84. LLC

Test Phase: Long Term, Main Valve Fully Open, No Dilution Air

TABLE 3

PILOT TEST INDUCED VACUUM DATA SHEET
Full Scale SSD Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Project Number: 12.0076252.10
Date: 5/1/2019
Weather: Partly Cloudy, Light Precip, 50 F
Personnel: PB, BR
Vapor Extraction Well(s): GZA-EP-2
Test Start Time: 11:45
Test End Time 13:15

Notes: Ambient PID - 0.5 ppm
*Vac too high for PID pump @extraction well
Using GZA PID

Time of Readings	Elapsed Time	Extraction Well				Observation Points							
		GZA-EP-002				VP-5		VP-6		VP-7			
		VAC	PID	Velocity	Flow	VAC	PID	VAC	PID	VAC	PID		
hr:min	min	in-H20	ppm	ft/min	cfm	in-H20	ppm	in-H20	ppm	in-H20	ppm		
11:45	0	30	*	1600	37	0.060	1.1	0.020	1.5	0.015	2.3		
12:00	15	31	*	1620	38	0.060	-	0.020	-	0.020	-		
12:15	30	31	*	1620	38	0.060	1.0	0.020	1.1	0.020	2.0		
12:30	45	32	*	1630	38	0.060	-	0.020	-	0.020	-		
12:45	60	32	*	1630	38	0.060	1.0	0.020	1.0	0.020	2.0		
13:00	75	32	*	1630	38	0.060	-	0.020	-	0.020	-		

Abbreviations:

Vac: Vacuum
hr:min hours/minutes
in-H20 inches of water
ppm: Part per Million
ft/min: feet per minute
cfm: cubic feet per minute

Pipe Diameter 2.067 inches

Pipe Diameter 0.1723 feet

TABLE 4

AIR SAMPLE ANALYTICAL RESULTS

Full Scale SSD System Design Report - Sloop Brewery

2070 Route 52

Hopewell Junction, NY 12533

LOCATION		Soil Vapor Intrusion Matrix in the State of New York	NYSDOH AGV[1]	Fuel Oil 2003 Upper Indoor[2]	BASE Data 90th[3]	2005 95th Percentile Indoor[4]	Units	IA-001		SV-001		AMBIENT-1**		AMBIENT-2**	
SAMPLING DATE								5/1/2019		5/1/2019		5/1/2019		5/1/2019	
LAB SAMPLE ID								L1918329-03		L1918329-04		L1918329-01		L1918329-02	
SAMPLE TYPE								AIR		SOIL_VAPOR		AIR		AIR	
SAMPLE DEPTH (ft.)															
								Results	RL	Results	RL	Results	RL	Results	RL
Volatile Organics in Air															
	Dichlorodifluoromethane			10	16.5		ug/m3	2.54	0.989	8.95	0.989	2.68	0.989	2.68	0.989
	Chloromethane			4.2	3.7		ug/m3	1.24	0.413	1.27	0.413	1.37	0.413	1.35	0.413
	Freon-114			0.4			ug/m3	ND	1.4	ND	1.4	ND	1.4	ND	1.4
	Vinyl chloride			0.4	1.9		ug/m3	-	-	ND	0.511	-	-	-	-
	1,3-Butadiene				3		ug/m3	ND	0.442	ND	0.442	ND	0.442	ND	0.442
	Bromomethane			0.5	1.7		ug/m3	ND	0.777	ND	0.777	ND	0.777	ND	0.777
	Chloroethane			0.4	1.1		ug/m3	ND	0.528	ND	0.528	ND	0.528	ND	0.528
	Vinyl bromide						ug/m3	ND	0.874	ND	0.874	ND	0.874	ND	0.874
	Acetone			115	98.9	45.8	ug/m3	8.03	2.38	33	2.38	8.29	2.38	4.63	2.38
	Trichlorofluoromethane			12	18.1		ug/m3	4.62	1.12	18	1.12	1.43	1.12	1.31	1.12
	Isopropanol				250		ug/m3	29	1.23	29.5	1.23	ND	1.23	3.02	1.23
	1,1-Dichloroethene			0.4	1.4		ug/m3	-	-	ND	0.793	-	-	-	-
	Tertiary butyl Alcohol						ug/m3	ND	1.52	4.7	1.52	ND	1.52	ND	1.52
	Methylene chloride		60	16	10	7.5	ug/m3	ND	1.74	ND	1.74	1.87	1.74	ND	1.74
	3-Chloropropene						ug/m3	ND	0.626	ND	0.626	ND	0.626	ND	0.626
	Carbon disulfide				4.2		ug/m3	ND	0.623	ND	0.623	ND	0.623	ND	0.623
	Freon-113				3.5		ug/m3	ND	1.53	1.73	1.53	ND	1.53	ND	1.53
	trans-1,2-Dichloroethene						ug/m3	ND	0.793	ND	0.793	ND	0.793	ND	0.793
	1,1-Dichloroethane			0.4	0.7		ug/m3	ND	0.809	ND	0.809	ND	0.809	ND	0.809
	Methyl tert butyl ether			14	11.5	36	ug/m3	ND	0.721	ND	0.721	ND	0.721	ND	0.721
	2-Butanone				12		ug/m3	ND	1.47	13.7	1.47	1.58	1.47	ND	1.47
	cis-1,2-Dichloroethene			0.4	1.9		ug/m3	-	-	ND	0.793	-	-	-	-
	Ethyl Acetate				5.4		ug/m3	ND	1.8	ND	1.8	ND	1.8	ND	1.8
	Chloroform			1.2	1.1	6.34	ug/m3	ND	0.977	ND	0.977	ND	0.977	ND	0.977
	Tetrahydrofuran			0.8			ug/m3	ND	1.47	16.9	1.47	**4.9**	1.47	ND	1.47
	1,2-Dichloroethane			0.4	0.9		ug/m3	ND	0.809	ND	0.809	ND	0.809	ND	0.809
	n-Hexane			14	10.2		ug/m3	ND	0.705	ND	0.705	ND	0.705	ND	0.705
	1,1,1-Trichloroethane	100		2.5	20.6		ug/m3	-	-	ND	1.09	-	-	-	-
	Benzene			13	9.4	10	ug/m3	ND	0.639	ND	0.639	0.671	0.639	ND	0.639
	Carbon tetrachloride			1.3	1.3	1.1	ug/m3	-	-	ND	1.26	-	-	-	-
	Cyclohexane			6.3			ug/m3	ND	0.688	ND	0.688	ND	0.688	ND	0.688
	1,2-Dichloropropane			0.4	1.6		ug/m3	ND	0.924	ND	0.924	ND	0.924	ND	0.924
	Bromodichloromethane						ug/m3	ND	1.34	ND	1.34	ND	1.34	ND	1.34
	1,4-Dioxane						ug/m3	ND	0.721	ND	0.721	ND	0.721	ND	0.721
	Trichloroethene		2	0.5	4.2	1.36	ug/m3	-	-	4.61	1.07	-	-	-	-
	2,2,4-Trimethylpentane			5			ug/m3	ND	0.934	ND	0.934	ND	0.934	ND	0.934
	Heptane						ug/m3	ND	0.82	ND	0.82	ND	0.82	ND	0.82
	2-Hexanone			0.4	2.3		ug/m3	ND	0.82	1.3	0.82	ND	0.82	ND	0.82

TABLE 4
AIR SAMPLE ANALYTICAL RESULTS
Full Scale SSD System Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, NY 12533

	cis-1,3-Dichloropropene			1.9	6		ug/m3	ND	0.908	ND	0.908	ND	0.908	ND	0.908
	4-Methyl-2-pentanone				1.3		ug/m3	ND	2.05	ND	2.05	ND	2.05	ND	2.05
	trans-1,3-Dichloropropene			0.4	1.5		ug/m3	ND	0.908	ND	0.908	ND	0.908	ND	0.908
	1,1,2-Trichloroethane			57	43	39.8	ug/m3	ND	1.09	ND	1.09	ND	1.09	ND	1.09
	Toluene						ug/m3	ND	0.754	10.7	0.754	1.15	0.754	ND	0.754
	Dibromochloromethane						ug/m3	ND	1.7	ND	1.7	ND	1.7	ND	1.7
	1,2-Dibromoethane			0.4	1.5		ug/m3	ND	1.54	ND	1.54	ND	1.54	ND	1.54
	Tetrachloroethene	100	30	2.5	15.9	6.01	ug/m3	-	-	69.2	1.36	-	-	-	-
	Chlorobenzene			0.4	0.9		ug/m3	ND	0.921	ND	0.921	ND	0.921	ND	0.921
	Ethylbenzene			6.4	5.7	7.62	ug/m3	ND	0.869	1.2	0.869	ND	0.869	ND	0.869
	p/m-Xylene			11	22.2	22.2	ug/m3	ND	1.74	5.13	1.74	ND	1.74	ND	1.74
	Bromoform						ug/m3	ND	2.07	ND	2.07	ND	2.07	ND	2.07
	Styrene			1.4	1.9	5.13	ug/m3	ND	0.852	ND	0.852	ND	0.852	ND	0.852
	1,1,2,2-Tetrachloroethane			0.4			ug/m3	ND	1.37	ND	1.37	ND	1.37	ND	1.37
	o-Xylene			7.1	7.9	7.24	ug/m3	ND	0.869	2.29	0.869	ND	0.869	ND	0.869
	4-Ethyltoluene				3.6		ug/m3	ND	0.983	ND	0.983	ND	0.983	ND	0.983
	1,3,5-Trimethylbenzene			3.9	3.7		ug/m3	ND	0.983	ND	0.983	ND	0.983	ND	0.983
	1,2,4-Trimethylbenzene			9.8	9.5		ug/m3	ND	0.983	3.51	0.983	ND	0.983	ND	0.983
	Benzyl chloride				6.8		ug/m3	ND	1.04	ND	1.04	ND	1.04	ND	1.04
	1,3-Dichlorobenzene			0.5	2.4		ug/m3	ND	1.2	ND	1.2	ND	1.2	ND	1.2
	1,4-Dichlorobenzene			1.2	5.5	344	ug/m3	ND	1.2	ND	1.2	ND	1.2	ND	1.2
	1,2-Dichlorobenzene			0.5	1.2		ug/m3	ND	1.2	ND	1.2	ND	1.2	ND	1.2
	1,2,4-Trichlorobenzene			0.5	6.8		ug/m3	ND	1.48	ND	1.48	ND	1.48	ND	1.48
	Hexachlorobutadiene			0.5	6.8		ug/m3	ND	2.13	ND	2.13	ND	2.13	ND	2.13
Volatile Organics in Air by SIM															
	Vinyl chloride			0.4	1.9		ug/m3	ND	0.051	-	-	ND	0.051	ND	0.051
	1,1-Dichloroethene			0.4	1.4		ug/m3	ND	0.079	-	-	ND	0.079	ND	0.079
	cis-1,2-Dichloroethene			0.4	1.9		ug/m3	ND	0.079	-	-	ND	0.079	ND	0.079
	1,1,1-Trichloroethane	100		2.5	20.6		ug/m3	ND	0.109	-	-	ND	0.109	ND	0.109
	Carbon tetrachloride	5		1.3	1.3	1.1	ug/m3	0.503	0.126	-	-	0.554	0.126	0.497	0.126
	Trichloroethene	5	2	0.5	4.2	1.36	ug/m3	ND	0.107	-	-	ND	0.107	ND	0.107
	Tetrachloroethene	100	30	2.5	15.9	6.01	ug/m3	0.597	0.136	-	-	0.19	0.136	ND	0.136

Notes:

1 - NYSDOH Air Guidance Value
2 - Table C-1 2003 Upper Fence Study of Volatile Organic Chemicals in air of Fuel Oil Heated Homes for Indoor Air
3 - Table C-2 2001 USEPA BASE 90th Percentile for Indoor Air
4 - Table C-5 2005 Health Effects Institute 95th Percentile for Indoor Air
8 This value exceeds Soil Vapor Intrusion Matrix for NYS
4 This value exceeds NYSDOH AGV
6 This value exceeds the regional indoor air criteria
2 This detection limit exceeds the applicable standard(s)
Qual - Laboratory data qualifier
U - The compound was not detected at the indicated concentration.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL. The concentration given is an approximate value.
* Comparison is not performed on parameters with non-numeric criteria.
** Results of this sample were used for background comparison. They were not compared against any regulatory standards.

TABLE 5

INPUT PARAMETERS FOR AERSCREEN MODELING

Full Scale Sub-Slab Depressurization Design - Sloop Brewery

2070 Route 52

Hopewell Junction, New York 12533

Details	Units	SV-001
Emission Rate	lbs/hr	2.49E-05
Stack Height	feet	10
Stack Diameter	in	4
Stack Temperature	C	Ambient
Exit Velocity	ft/s	5.35
Stack Flow Rate	cfm	28.00
Model Mode	-	URBAN
Population	-	2,000
Dist to Ambient Air	feet	3

TABLE 5A

INPUT PARAMETERS FOR AERSCREEN MODELING USING DESIGN PARAMETERS
Full Scale Sub-Slab Depressurization Design - Sloop Brewery
2070 Route 52
Hopewell Junction, New York 12533

Details	Units	SV-001
Emission Rate	lbs/hr	1.87E-04
Stack Height	feet	10
Stack Diameter	in	4
Stack Temperature	C	Ambient
Exit Velocity	ft/s	100.08
Stack Flow Rate	cfm	524.00
Model Mode	-	URBAN
Population	-	2,000
Dist to Ambient Air	feet	3

TABLE 6
AERSCREEN MODEL OUTPUT - 28 CFM
Full Scale Sub-Slab Depressurization Design
2070 Route 52
Hopewell Junction, New York 12533

LOCATION: / SAMPLING DATE: 05/01/2019 / LAB SAMPLE ID: L1918329	CAS Number	Toxicity	SGC ug/m3	AGC ug/m3	Molecular Weight	Qal	Results in ug/m^3	Exceedes SGC	Exceedes AGC*	Results to Use in ug/m^3	Results in ug/ft^3	Flow Rate (ft^3) per Hour [1]	Mass ug per Hour	Mass g per Second	Mass pounds per Hour	Mass pounds per Year	Percentage for each Contaminant	Maximium Concentration from Aerscreen	Exceedes AGC**
NJDEP TO-15																			
Dichlorodifluoromethane	75-71-8	NA	---	12,000.00	120.9		8.95	No	No	8.95	0.25	1,680	425.8	1.18E-07	9.39E-07	8.22E-03	3.77E-02	1.88E-03	No
Chloromethane	74-87-3	M	22,000	90.00	50.5		1.27	No	No	1.27	0.04	1,680	1.0	2.78E-10	2.20E-09	1.93E-05	8.85E-05	4.42E-06	No
Freon-114	76-14-2	NA	---	17,000.00	170.9	U	1.4	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Vinyl chloride	75-01-4	H	180,000	0.11	62.5	U	0.511	No	YES	0.511	0.01	1,680	24.3	6.75E-09	5.36E-08	4.69E-04	2.15E-03	1.08E-04	No
1,3-Butadiene	106-99-0	H	---	0.0330	54.1	U	0.442	No	YES	0.442	0.01	1,680	21.0	5.84E-09	4.64E-08	4.06E-04	1.86E-03	9.30E-05	No
Bromomethane	74-83-9	M	3,900	5.00	94.9	U	0.777	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Chloroethane	75-00-3	L	---	10,000.00	64.5	U	0.528	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Vinyl bromide	593-60-2	H	---	3.00	106.9	U	0.874	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Acetone	67-64-1	L	180,000	30,000.00	58.1		33	No	No	33	0.93	1,680	1569.9	4.36E-07	3.46E-06	3.03E-02	1.39E-01	6.94E-03	No
Trichlorofluoromethane	75-69-4	L	9,000	5,000.00	137.4		18	No	No	18	0.51	1,680	856.3	2.38E-07	1.89E-06	1.65E-02	7.58E-02	3.79E-03	No
Isopropanol	67-63-0	M	98,000	7,000.00	60.1		29.5	No	No	29.5	0.84	1,680	1403.4	3.90E-07	3.09E-06	2.71E-02	1.24E-01	6.21E-03	No
1,1-Dichloroethene	75-35-4	M	---	200.00	96.9	U	0.793	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Tertiary butyl Alcohol	75-65-0	NA	---	720.00	74.1		4.7	No	No	4.7	0.13	1,680	223.6	6.21E-08	4.93E-07	4.32E-03	1.98E-02	9.89E-04	No
Methylene chloride	75-09-2	M	14,000	60.00	84.9	U	1.74	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
3-Chloropropene	107-05-1	M	600	1.00	76.5	U	0.626	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Carbon disulfide	75-15-0	M	6,200	700.00	76.1	U	0.623	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Freon-113	76-13-1	L	960,000	180,000.00	187.4		1.73	No	No	1.73	0.05	1,680	82.3	2.29E-08	1.81E-07	1.59E-03	7.28E-03	3.64E-04	No
trans-1,2-Dichloroethene	156-60-5	M	---	63.00	96.9	U	0.793	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1-Dichloroethane	75-34-3	L	---	0.63	99	U	0.809	No	YES	0.809	0.02	1,680	38.5	1.07E-08	8.48E-08	7.43E-04	3.40E-03	1.70E-04	No
Methyl tert butyl ether	1634-04-4	M	---	3.80	88.2	U	0.721	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
2-Butanone	78-93-3	M	13,000	5,000.00	72.1		13.7	No	No	13.7	0.39	1,680	651.7	1.81E-07	1.44E-06	1.26E-02	5.77E-02	2.88E-03	No
cis-1,2-Dichloroethene	156-59-2	M	---	63.00	96.9	U	0.793	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Ethyl Acetate	141-78-6	M	---	3,400.00	88.1	U	1.8	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Chloroform	67-66-3	H	150	14.7000	119.4	U	0.977	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Tetrahydrofuran	109-99-9	M	30,000	350.00	72.1		16.9	No	No	16.9	0.48	1,680	804.0	2.23E-07	1.77E-06	1.55E-02	7.11E-02	3.56E-03	No
1,2-Dichloroethane	107-06-2	H	---	0.038	99	U	0.809	No	YES	0.809	0.02	1,680	38.5	1.07E-08	8.48E-08	7.43E-04	3.40E-03	1.70E-04	No
n-Hexane	110-54-3	M	---	700.00	86.2	U	0.705	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,1-Trichloroethane	71-55-6	L	9,000	5,000.00	133.4	U	1.09	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Benzene	71-43-2	H	1,300	0.13	78.1	U	0.639	No	YES	0.639	0.02	1,680	30.4	8.44E-09	6.70E-08	5.87E-04	2.69E-03	1.34E-04	No
Carbon tetrachloride	56-23-5	H	1,900	0.17	153.8	U	1.26	No	YES	1.26	0.04	1,680	59.9	1.67E-08	1.32E-07	1.16E-03	5.30E-03	2.65E-04	No
Cyclohexane	110-82-7	L	---	6,000.00	84.2	U	0.688	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2-Dichloropropane	78-87-5	M	---	4.00	113	U	0.924	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Bromodichloromethane	75-27-4	M	---	70.00	163.8	U	1.34	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,4-Dioxane	123-91-1	M	3,000	0.20	88.1	U	0.721	No	YES	0.721	0.02	1,680	34.3	9.53E-09	7.56E-08	6.62E-04	3.03E-03	1.52E-04	No
Trichloroethene	79-01-6	H	20	0.20	131.4		4.61	No	YES	4.61	0.13	1,680	219.3	6.09E-08	4.83E-07	4.24E-03	1.94E-02	9.70E-04	No
2,2,4-Trimethylpentane	540-84-1	M	---	3,300.00	114.2	U	0.934	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Heptane	142-82-5	M	210,000	3,900.00		U	0.82	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
cis-1,3-Dichloropropene	10061-01-5	NL	---	---	111	U	0.908	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
4-Methyl-2-pentanone	108-10-1	M	31,000	3,000.00	100.2	U	2.05	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
trans-1,3-Dichloropropene	10061-02-6	NL	---	---	111	U	0.908	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,2-Trichloroethane	79-00-5	M	---	1.40	133.4	U	1.09	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Toluene	108-88-3	L	37,000	5,000.00	92.1		10.7	No	No	10.7	0.30	1,680	509.0	1.41E-07	1.12E-06	9.83E-03	4.50E-02	2.25E-03	No
2-Hexanone	591-78-6	NA	4,000	30.00	100.2		1.3	No	No	1.3	0.04	1,680	61.8	1.72E-08	1.36E-07	1.19E-03	5.47E-03	2.74E-04	No
Dibromochloromethane	124-48-1	NL	---	---	208.3	U	1.7	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2-Dibromoethane	106-93-4	H	---	0.0017	187.9	U	1.54	No	YES	1.54	0.04	1,680	73.3	2.04E-08	1.62E-07	1.41E-03	6.48E-03	3.24E-04	No
Tetrachloroethene	127-18-4	H	300	4.00	165.8		69.2	No	YES	69.2	1.96	1,680	3292.0	9.14E-07	7.26E-06	6.36E-02	2.91E-01	1.46E-02	No
Chlorobenzene	108-90-7	M	---	60.00	112.6	U	0.921	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No

TABLE 6
AERSCREEN MODEL OUTPUT - 28 CFM
Full Scale Sub-Slab Depressurization Design
2070 Route 52
Hopewell Junction, New York 12533

Ethylbenzene	100-41-4	M	---	1,000.00	106.2		1.2	No	No	1.2	0.03	1,680	57.1	1.59E-08	1.26E-07	1.10E-03	5.05E-03	2.53E-04	No
p/m-Xylene	179601-23-1	L	4,300	100.00	106.2		5.13	No	No	5.13	0.15	1,680	244.0	6.78E-08	5.38E-07	4.71E-03	2.16E-02	1.08E-03	No
Bromoform	75-25-2	M	---	0.91	252.8	U	2.07	No	YES	2.07	0.06	1,680	98.5	2.74E-08	2.17E-07	1.90E-03	8.71E-03	4.36E-04	No
Styrene	100-42-5	M	17,000	1,000.00	104.1	U	0.852	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,2,2-Tetrachloroethane	79-34-5	M	---	16.00	167.9	U	1.37	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
o-Xylene	95-47-6	M	22,000	100.00	106.2		2.29	No	No	2.29	0.06	1,680	108.9	3.03E-08	2.40E-07	2.10E-03	9.64E-03	4.82E-04	No
4-Ethyltoluene	622-96-8	NL	---	---	120.2	U	0.983	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,3,5-Trimethylbenzene	108-67-8	M	---	6.00	120.2	U	0.983	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2,4-Trimethylbenzene	95-63-6	NA	---	6.00	120.2		3.51	No	No	3.51	0.10	1,680	167.0	4.64E-08	3.68E-07	3.22E-03	1.48E-02	7.39E-04	No
Benzyl chloride	100-44-7	H	240	0.02	126.6	U	1.04	No	YES	1.04	0.03	1,680	49.5	1.37E-08	1.09E-07	9.55E-04	4.38E-03	2.19E-04	No
1,3-Dichlorobenzene	541-73-1	M	---	10.00	147	U	1.2	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,4-Dichlorobenzene	106-46-7	M	---	0.09	147	U	1.2	No	YES	1.2	0.03	1,680	57.1	1.59E-08	1.26E-07	1.10E-03	5.05E-03	2.53E-04	No
1,2-Dichlorobenzene	95-50-1	M	30,000	200.00	147	U	1.2	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2,4-Trichlorobenzene	120-82-1	NA	3,700	---	181.5	U	1.48	No	No	0	0.00	1,680	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Hexachlorobutadiene	87-68-3	M	---	0.045	260.8	U	2.13	No	YES	2.13	0.06	1,680	101.3	2.81E-08	2.23E-07	1.96E-03	8.96E-03	4.48E-04	No
Total VOCs	---	---	---	---	---	---	273	---	---	239	7	---	11,304	3.14E-06	2.4921E-05	0.22	1.00E+00	0.05	

Notes/Abbreviations:
NA - Not Availible
NL - Compound not listed in DAR-1 Appendix C SCG/ACG Table
H - High Toxicity
M - Medium Toxicity
L - Low Toxicity
CAS - Chemical Abstract Service
SGCs - Short-term Guideline Concentrations from DAR-1 AGC/SGC Table (02-28-2014 version)
AGCs - Annual Guideline Concentrations from DAR-1 AGC/SGC Table (02-28-2014 version)
ug/m^3 - Microgram per cubic meter
Qal - Laboratory Qualifier
B - Detectable concentrations were in the laboratory blank
U - Laboratory results are less than the reporting limit
ppbv - Parts per billion by volume
ug/ft^3 - Micrograms per cubic foot
ug - Micrograms
ft^3 - Cubic Feet
Laboratory Reporting Limit > AGCs
Value Exceeds AGC

TABLE 6A
AERSCREEN MODEL OUTPUT - 524 CFM
Full Scale Sub-Slab Depressurization Design
2070 Route 52
Hopewell Junction, New York 12533

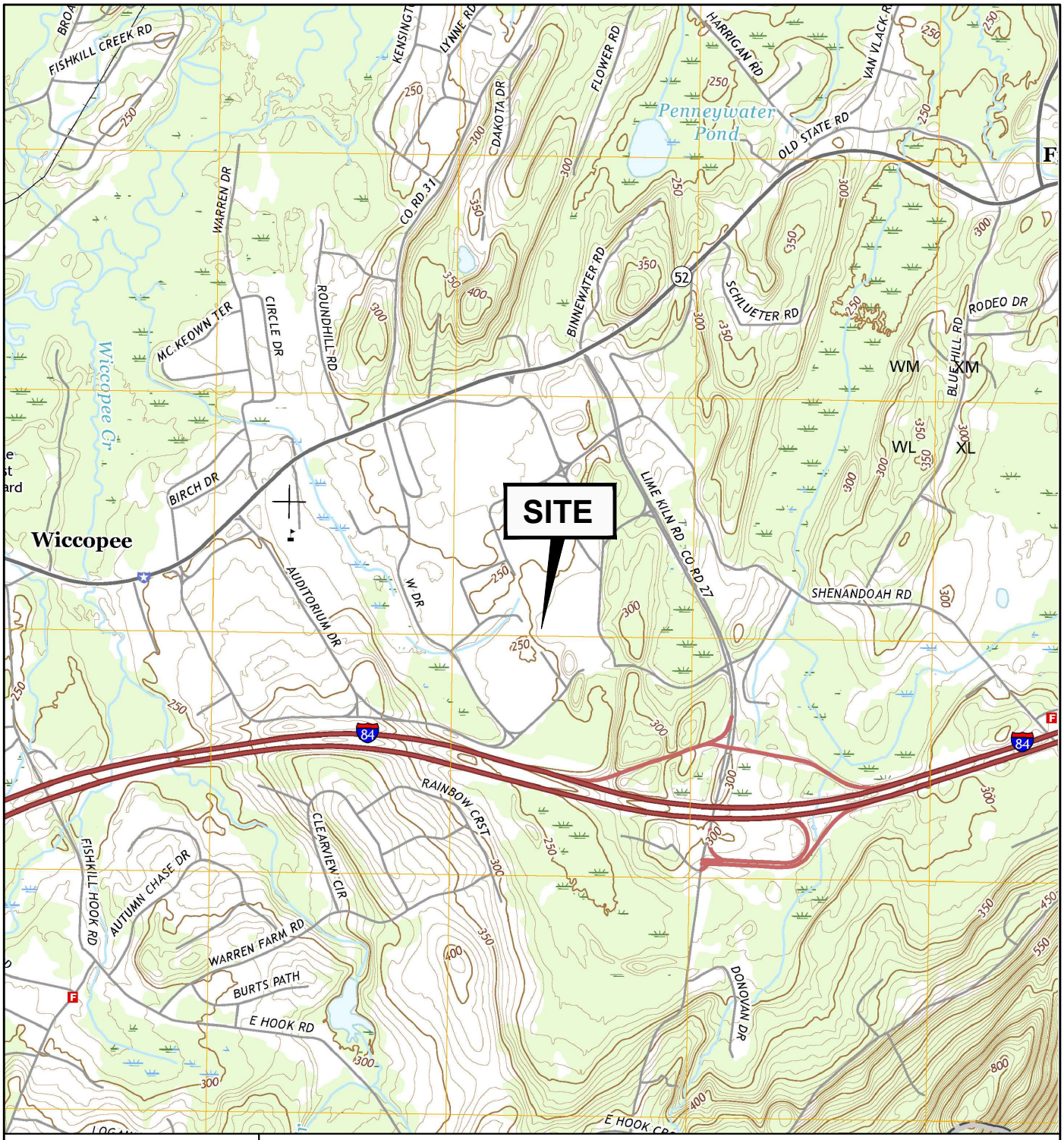
LOCATION: / SAMPLING DATE: 05/01/2019 / LAB SAMPLE ID: L1918329	CAS Number	Toxicity	SGC ug/m3	AGC ug/m3	Molecular Weight	Qal	Results in ug/m^3	Exceedes SGC	Exceedes AGC*	Results to Use in ug/m^3	Results in ug/ft^3	Flow Rate (ft^3) per Hour [1]	Mass ug per Hour	Mass g per Second	Mass pounds per Hour	Mass pounds per Year	Percentage for each Contaminant	Maximium Concentration from Aerscreen	Exceedes AGC**
NJDEP TO-15																			
Dichlorodifluoromethane	75-71-8	NA	---	12,000.00	120.9		8.95	No	No	8.95	0.25	12,576	3187.2	8.85E-07	7.03E-06	6.16E-02	3.77E-02	7.53E-03	No
Chloromethane	74-87-3	M	22,000	90.00	50.5		1.27	No	No	1.27	0.04	12,576	1.0	2.78E-10	2.20E-09	1.93E-05	1.18E-05	2.36E-06	No
Freon-114	76-14-2	NA	---	17,000.00	170.9	U	1.4	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Vinyl chloride	75-01-4	H	180,000	0.11	62.5	U	0.511	No	YES	0.511	0.01	12,576	182.0	5.05E-08	4.01E-07	3.51E-03	2.15E-03	4.30E-04	No
1,3-Butadiene	106-99-0	H	---	0.0330	54.1	U	0.442	No	YES	0.442	0.01	12,576	157.4	4.37E-08	3.47E-07	3.04E-03	1.86E-03	3.72E-04	No
Bromomethane	74-83-9	M	3,900	5.00	94.9	U	0.777	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Chloroethane	75-00-3	L	---	10,000.00	64.5	U	0.528	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Vinyl bromide	593-60-2	H	---	3.00	106.9	U	0.874	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Acetone	67-64-1	L	180,000	30,000.00	58.1		33	No	No	33	0.93	12,576	11751.7	3.26E-06	2.59E-05	2.27E-01	1.39E-01	2.78E-02	No
Trichlorofluoromethane	75-69-4	L	9,000	5,000.00	137.4		18	No	No	18	0.51	12,576	6410.0	1.78E-06	1.41E-05	1.24E-01	7.58E-02	1.52E-02	No
Isopropanol	67-63-0	M	98,000	7,000.00	60.1		29.5	No	No	29.5	0.84	12,576	10505.3	2.92E-06	2.32E-05	2.03E-01	1.24E-01	2.48E-02	No
1,1-Dichloroethene	75-35-4	M	---	200.00	96.9	U	0.793	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Tertiary butyl Alcohol	75-65-0	NA	---	720.00	74.1		4.7	No	No	4.7	0.13	12,576	1673.7	4.65E-07	3.69E-06	3.23E-02	1.98E-02	3.96E-03	No
Methylene chloride	75-09-2	M	14,000	60.00	84.9	U	1.74	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
3-Chloropropene	107-05-1	M	600	1.00	76.5	U	0.626	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Carbon disulfide	75-15-0	M	6,200	700.00	76.1	U	0.623	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Freon-113	76-13-1	L	960,000	180,000.00	187.4		1.73	No	No	1.73	0.05	12,576	616.1	1.71E-07	1.36E-06	1.19E-02	7.28E-03	1.46E-03	No
trans-1,2-Dichloroethene	156-60-5	M	---	63.00	96.9	U	0.793	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1-Dichloroethane	75-34-3	L	---	0.63	99	U	0.809	No	YES	0.809	0.02	12,576	288.1	8.00E-08	6.35E-07	5.56E-03	3.40E-03	6.81E-04	No
Methyl tert butyl ether	1634-04-4	M	---	3.80	88.2	U	0.721	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
2-Butanone	78-93-3	M	13,000	5,000.00	72.1		13.7	No	No	13.7	0.39	12,576	4878.7	1.36E-06	1.08E-05	9.42E-02	5.77E-02	1.15E-02	No
cis-1,2-Dichloroethene	156-59-2	M	---	63.00	96.9	U	0.793	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Ethyl Acetate	141-78-6	M	---	3,400.00	88.1	U	1.8	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Chloroform	67-66-3	H	150	14.7000	119.4	U	0.977	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Tetrahydrofuran	109-99-9	M	30,000	350.00	72.1		16.9	No	No	16.9	0.48	12,576	6018.3	1.67E-06	1.33E-05	1.16E-01	7.11E-02	1.42E-02	No
1,2-Dichloroethane	107-06-2	H	---	0.038	99	U	0.809	No	YES	0.809	0.02	12,576	288.1	8.00E-08	6.35E-07	5.56E-03	3.40E-03	6.81E-04	No
n-Hexane	110-54-3	M	---	700.00	86.2	U	0.705	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,1-Trichloroethane	71-55-6	L	9,000	5,000.00	133.4	U	1.09	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Benzene	71-43-2	H	1,300	0.13	78.1	U	0.639	No	YES	0.639	0.02	12,576	227.6	6.32E-08	5.02E-07	4.39E-03	2.69E-03	5.38E-04	No
Carbon tetrachloride	56-23-5	H	1,900	0.17	153.8	U	1.26	No	YES	1.26	0.04	12,576	448.7	1.25E-07	9.89E-07	8.67E-03	5.30E-03	1.06E-03	No
Cyclohexane	110-82-7	L	---	6,000.00	84.2	U	0.688	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2-Dichloropropane	78-87-5	M	---	4.00	113	U	0.924	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Bromodichloromethane	75-27-4	M	---	70.00	163.8	U	1.34	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,4-Dioxane	123-91-1	M	3,000	0.20	88.1	U	0.721	No	YES	0.721	0.02	12,576	256.8	7.13E-08	5.66E-07	4.96E-03	3.03E-03	6.07E-04	No
Trichloroethene	79-01-6	H	20	0.20	131.4		4.61	No	YES	4.61	0.13	12,576	1641.7	4.56E-07	3.62E-06	3.17E-02	1.94E-02	3.88E-03	No
2,2,4-Trimethylpentane	540-84-1	M	---	3,300.00	114.2	U	0.934	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Heptane	142-82-5	M	210,000	3,900.00		U	0.82	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
cis-1,3-Dichloropropene	10061-01-5	NL	---	---	111	U	0.908	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
4-Methyl-2-pentanone	108-10-1	M	31,000	3,000.00	100.2	U	2.05	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
trans-1,3-Dichloropropene	10061-02-6	NL	---	---	111	U	0.908	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,2-Trichloroethane	79-00-5	M	---	1.40	133.4	U	1.09	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Toluene	108-88-3	L	37,000	5,000.00	92.1		10.7	No	No	10.7	0.30	12,576	3810.4	1.06E-06	8.40E-06	7.36E-02	4.50E-02	9.01E-03	No
2-Hexanone	591-78-6	NA	4,000	30.00	100.2		1.3	No	No	1.3	0.04	12,576	462.9	1.29E-07	1.02E-06	8.94E-03	5.47E-03	1.09E-03	No
Dibromochloromethane	124-48-1	NL	---	---	208.3	U	1.7	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2-Dibromoethane	106-93-4	H	---	0.0017	187.9	U	1.54	No	YES	1.54	0.04	12,576	548.4	1.52E-07	1.21E-06	1.06E-02	6.48E-03	1.30E-03	No
Tetrachloroethene	127-18-4	H	300	4.00	165.8		69.2	No	YES	69.2	1.96	12,576	24643.0	6.85E-06	5.43E-05	4.76E-01	2.91E-01	5.83E-02	No

TABLE 6A
AERSCREEN MODEL OUTPUT - 524 CFM
Full Scale Sub-Slab Depressurization Design
2070 Route 52
Hopewell Junction, New York 12533

Chlorobenzene	108-90-7	M	---	60.00	112.6	U	0.921	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Ethylbenzene	100-41-4	M	---	1,000.00	106.2		1.2	No	No	1.2	0.03	12,576	427.3	1.19E-07	9.42E-07	8.25E-03	5.05E-03	1.01E-03	No
p/m-Xylene	179601-23-1	L	4,300	100.00	106.2		5.13	No	No	5.13	0.15	12,576	1826.9	5.07E-07	4.03E-06	3.53E-02	2.16E-02	4.32E-03	No
Bromoform	75-25-2	M	---	0.91	252.8	U	2.07	No	YES	2.07	0.06	12,576	737.2	2.05E-07	1.63E-06	1.42E-02	8.71E-03	1.74E-03	No
Styrene	100-42-5	M	17,000	1,000.00	104.1	U	0.852	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,1,2,2-Tetrachloroethane	79-34-5	M	---	16.00	167.9	U	1.37	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
o-Xylene	95-47-6	M	22,000	100.00	106.2		2.29	No	No	2.29	0.06	12,576	815.5	2.27E-07	1.80E-06	1.57E-02	9.64E-03	1.93E-03	No
4-Ethyltoluene	622-96-8	NL	---	---	120.2	U	0.983	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,3,5-Trimethylbenzene	108-67-8	M	---	6.00	120.2	U	0.983	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2,4-Trimethylbenzene	95-63-6	NA	---	6.00	120.2		3.51	No	No	3.51	0.10	12,576	1250.0	3.47E-07	2.76E-06	2.41E-02	1.48E-02	2.95E-03	No
Benzyl chloride	100-44-7	H	240	0.02	126.6	U	1.04	No	YES	1.04	0.03	12,576	370.4	1.03E-07	8.16E-07	7.15E-03	4.38E-03	8.75E-04	No
1,3-Dichlorobenzene	541-73-1	M	---	10.00	147	U	1.2	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,4-Dichlorobenzene	106-46-7	M	---	0.09	147	U	1.2	No	YES	1.2	0.03	12,576	427.3	1.19E-07	9.42E-07	8.25E-03	5.05E-03	1.01E-03	No
1,2-Dichlorobenzene	95-50-1	M	30,000	200.00	147	U	1.2	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
1,2,4-Trichlorobenzene	120-82-1	NA	3,700	---	181.5	U	1.48	No	No	0	0.00	12,576	0.0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No
Hexachlorobutadiene	87-68-3	M	---	0.045	260.8	U	2.13	No	YES	2.13	0.06	12,576	758.5	2.11E-07	1.67E-06	1.46E-02	8.96E-03	1.79E-03	No
Total VOCs	---	---	---	---	---	---	273	---	---	239	7	---	84,610	2.35E-05	1.8653E-04	1.63	1.00E+00	0.2	

Notes/Abbreviations:
NA - Not Availible
NL - Compound not listed in DAR-1 Appendix C SCG/ACG Table
H - High Toxicity
M - Medium Toxicity
L - Low Toxicity
CAS - Chemical Abstract Service
SGCs - Short-term Guideline Concentrations from DAR-1 AGC/SGC Table (02-28-2014 version)
AGCs - Annual Guideline Concentrations from DAR-1 AGC/SGC Table (02-28-2014 version)
ug/m^3 - Microgram per cubic meter
Qal - Laboratory Qualifier
B - Detectable concentrations were in the laboratory blank
U - Laboratory results are less than the reporting limit
ppbv - Parts per billion by volume
ug/ft^3 - Micrograms per cubic foot
ug - Micrograms
ft^3 - Cubic Feet
Laboratory Reporting Limit > AGCs
Value Exceeds AGC

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

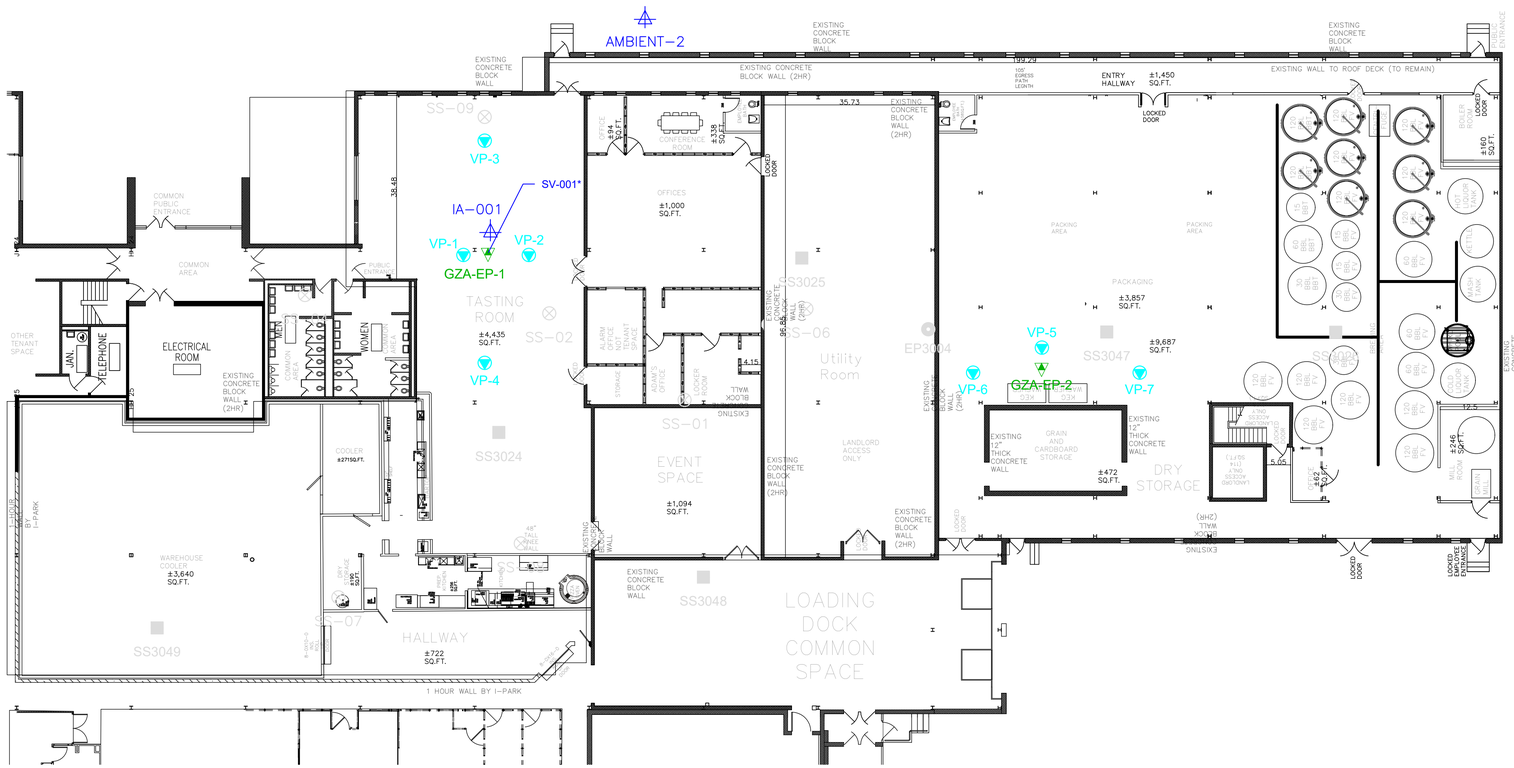
FULL SCALE SSD SYSTEM DESIGN -
SLOOP BREWERY

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

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

SITE LOCATION PLAN

PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: EH	FIGURE 1
DESIGNED BY: BP	DRAWN BY: PB	SCALE: 1" = 2,000'	
DATE: MARCH 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 1 OF 5



VP-1 — EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY GZA

GZA-EP-1 — EXISTING SOIL VAPOR EXTRACTION POINT INSTALLED BY GZA

SS3025 — EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY SANBORN

EP3004 — EXISTING SOIL VAPOR EXTRACTION POINT INSTALLED BY SANBORN

SS–01 — EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY WALDEN

AMBIENT–1 — AIR SAMPLE LOCATION

*NOTE: AIR SAMPLE SV-001 COLLECTED FROM RUNNING PILOT TEST MANIFOLD AT EXTRACTION POINT

BASEMAP OBTAINED FROM "SOIL VAPOR INTRUSION INVESTIGATION SAMPLING LOCATIONS" BY WALDEN ENVIRONMENTAL ENGINEERING, DATED 11/29/2018

AMBIENT–1

0 7.5' 15' 30' 45'

SCALE IN FEET 1" = 15'

NO.	ISSUE/DESCRIPTION	BY	DATE

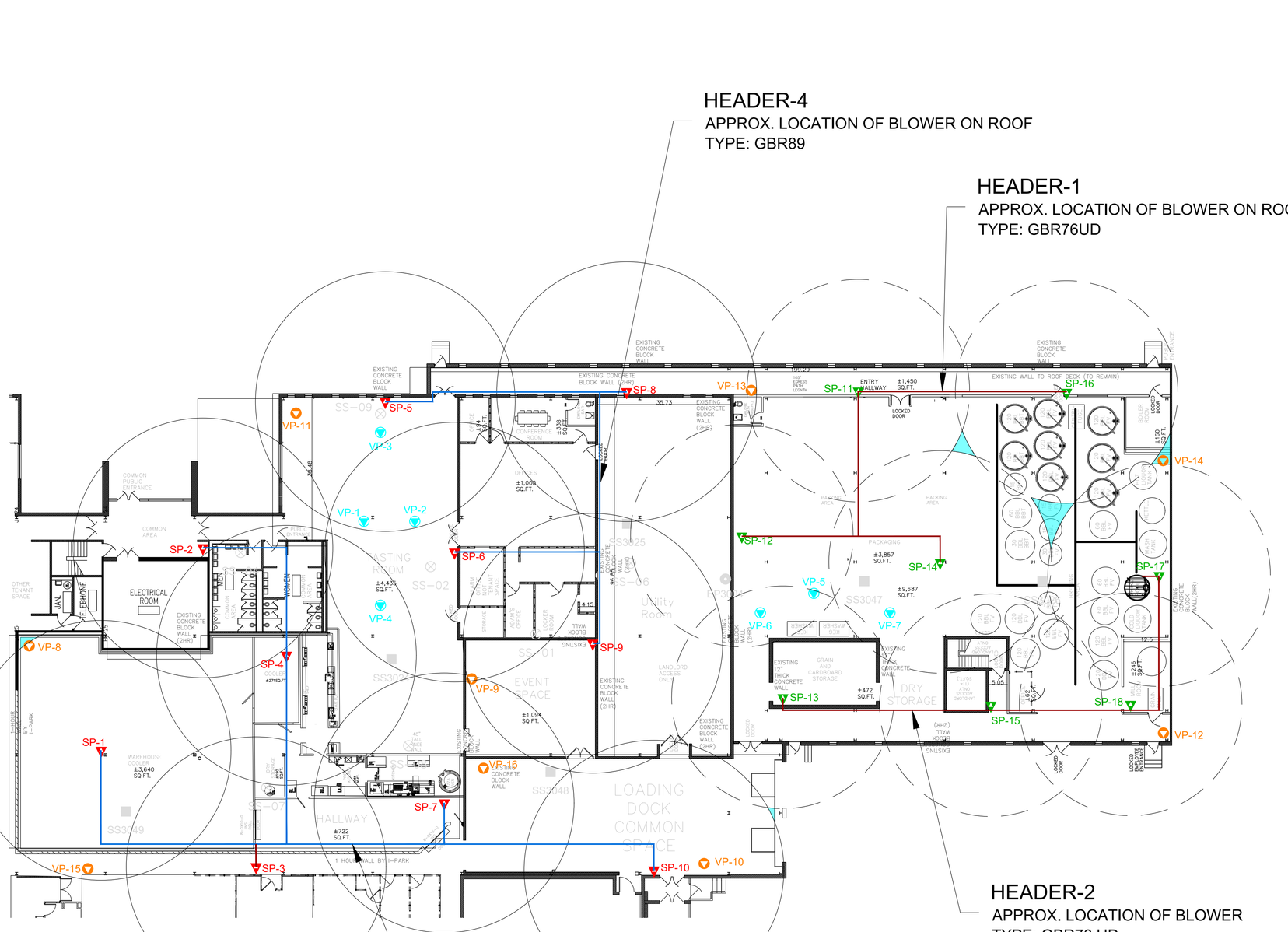
ERNEST R. HANNA

NY PROFESSIONAL ENGINEER
LICENSE #: 065440

FULL SCALE SSD SYSTEM DESIGN REPORT - SLOOP BREWERY

SSD SYSTEM PILOT TEST LAYOUT

PREPARED BY: GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		PREPARED FOR: I.PARK84, LLC. GREENWICH, CT	
PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: EH	FIGURE 2
DESIGNED BY: BP	DRAWN BY: PB	SCALE: 1" = 15'	
DATE: MAY, 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 2 OF 5



SP-1 PROPOSED LOCATION OF EXTRACTION POINTS (35' RADIUS OF INFLUENCE)

PROPOSED RADIUS OF INFLUENCE (35')

SP-6 PROPOSED LOCATION OF EXTRACTION POINTS (30' RADIUS OF INFLUENCE)

PROPOSED RADIUS OF INFLUENCE (30')

AREA NOT CAPTURED

VP-1 PROPOSED SOIL VAPOR ASSESSMENT POINT

VP-1 EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY GZA

SS3025 EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY SANBORN

EP3004 EXISTING SOIL VAPOR EXTRACTION POINT INSTALLED BY SANBORN

SS-01 EXISTING SOIL VAPOR ASSESSMENT POINT INSTALLED BY WALDEN

3" DIAMETER CAST IRON PIPE

4" DIAMETER CAST IRON PIPE

NOTES:
1) BASEMAP OBTAINED FROM "SOIL VAPOR INTRUSION INVESTIGATION SAMPLING LOCATIONS" BY WALDEN ENVIRONMENTAL ENGINEERING, DATED 11/29/2018
2) ALL THREE- AND FOUR-INCH VERTICAL RISER AND HEADER PIPING SHALL BE ROUTED AT THE INTERIOR CEILING LEVEL AND SECURED APPROPRIATELY USING METAL BRACKETS OR EQUIVALENT

0 7.5' 15' 30' 45'
SCALE IN FEET 1" = 15'

NO.	ISSUE/DESCRIPTION	BY	DATE

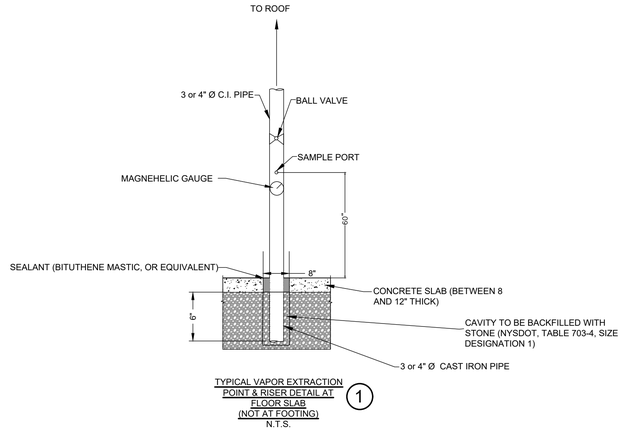
ERNEST R. HANNA

NY PROFESSIONAL ENGINEER
LICENSE #: 065440

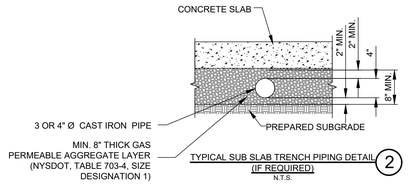
FULL SCALE SSD SYSTEM DESIGN REPORT - SLOOP BREWERY

FULL SCALE SSD SYSTEM LAYOUT WITH ROI

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		I.PARK84, LLC. GREENWICH, CT	
PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: EH	FIGURE 3
DESIGNED BY: BP	DRAWN BY: PB	SCALE: 1" = 15'	
DATE: JUNE, 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 3 OF 5



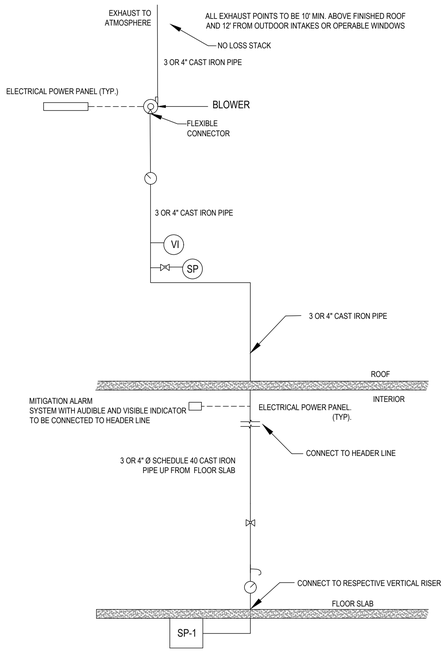
TYPICAL VAPOR EXTRACTION POINT & RISER DETAIL AT FLOOR SLAB (NOT AT FOOTING) 1
N.T.S.



TYPICAL SUB SLAB TRENCH PIPING DETAIL (IF REQUIRED) 2
N.T.S.

NOTES:

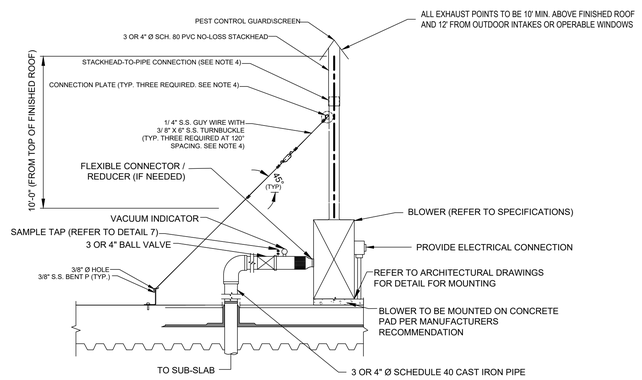
1. SUB-SLAB DEPRESSURIZATION (SSD) TRENCH PIPING WILL INCLUDE 3 OR 4" Ø CAST IRON BY A MANUFACTURAR APPROVED BY GZA.
2. 3 OR 4" Ø CAST IRON PIPING WILL CONNECT TO 3 OR 4" Ø CAST IRON RISER PIPING.
3. 3 OR 4" Ø SOLID CAST IRON RISER PIPING WILL CONNECT TO 3 OR 4" Ø CAST IRON PIPING USING APPROPRIATE PIPE ADAPTERS.
4. CONTRACTOR TO SUPPLY SHOP DRAWINGS OF PROPOSED CONSTRUCTION DETAILS FOR APPROVAL.



TYPICAL SSDS CROSS-SECTION 3
N.T.S.

LEGEND:

- PIPE
- ELECTRICAL CONDUIT
- SP-1 SUCTION PIT
- VI VACUUM INDICATOR
- FAN
- REDUCER
- BALL VALVE
- MAGNEHELIC GAUGE
- ANCO/CREMCO COUPLING
- BLIND FLANGE
- SAMPLE TAP ASSEMBLY

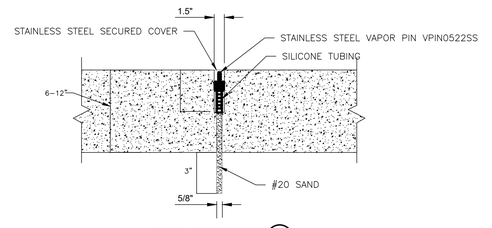


SUCTION FAN/EXHUAST STACK CONNECTION DETAIL 4
N.T.S.

NOTES:

1. NOT ALL REQUIRED ACCESSORIES ARE SHOWN. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ELECTRICAL WIRING AND EQUIPMENT DETAILS TO BE PROVIDED BY OTHERS.
3. PIPE AND EQUIPMENT ARRANGEMENT SHOWN FOR SCHEMATIC PURPOSES ONLY. SUBMIT SCALED DRAWING SHOWING PROPOSED ARRANGEMENT. CONTRACTOR IS REQUIRED TO OBTAIN APPROVAL OF ARRANGEMENT.
4. COORDINATE ALL ROOF PENETRATIONS WITH ALL OTHER TRADES TO ENSURE SEALED IN ACCORDANCE WITH WARRANTY.
5. PROVIDE SHOP DRAWINGS FOR BLOWER AND ACCESSORY LAYOUT.
6. ALL PLATES, PIPES, GUY WIRES, TURNBUCKLES, AND CLIPS SHALL BE ASTM G304 STAINLESS STEEL.
7. PROVIDE CONNECTION PER MANUFACTURERS RECOMMENDATION.
8. COORDINATE ALL ROOF PENETRATIONS FOR FAN SUPPORT WITH ARCHITECT.
9. PROVIDE CUT SHEETS IF ALTERNATIVE STACK MOUNTING IS PROPOSED

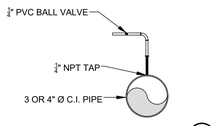
VAPOR EXTRACTION POINT AND RISER AT FOOTING DETAIL 5
N.T.S.



TYPICAL SUB SLAB VAPOR ASSESSMENT POINT 6
N.T.S.

INSTRUMENT SCHEDULE							
ITEM	DESCRIPTION	SERVICE	LOCATION	REQUIREMENTS	RANGE	REMARKS	MANUFACTURER/MODEL
VI	VACUUM INDICATOR	SSD SYSTEM	SUCTION FAN AND BLOWER	N/A	0-15 WC	FOR EACH BLOWER ASSEMBLY	WIKA MODEL 612.20, PART 9747724 OR EQUIVALENT
ALARM	MITIGATION ALARM	SSD SYSTEM	INTERIOR OF BUILDING AT HEADERS	N/A	N/A	FOR EACH HEADER ASSEMBLY	TJERNLUND MODEL RA1 OR EQUIVALENT

FAN SCHEDULE					
SERVICE	LOCATION	SIZE	MIN. CFM	MIN. RATE (INCHES WC)	MANUFACTURER/MODEL
HEADER-1	EAST ROOF	1.5 HP	70	20	OBAR GBR76UD
HEADER-2	EAST ROOF	1.5 HP	70	20	OBAR GBR76UD
HEADER-3	WEST ROOF	2 HP	240	11	OBAR GBR89
HEADER-4	WEST ROOF	2 HP	160	11	OBAR GBR89



SAMPLE TAP ASSEMBLY 7
N.T.S.

NO.	ISSUE/DESCRIPTION	BY	DATE

ERNEST R. HANNA

NY PROFESSIONAL ENGINEER
LICENSE #: 065440

FULL SCALE SSD SYSTEM DESIGN REPORT - SLOOP BREWERY

FULL SCALE SSD SYSTEM DETAILS

PREPARED BY:
GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

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

PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: EH	FIGURE 4
DESIGNED BY: BP	DRAWN BY: PB	SCALE: 1" = 15'	
DATE: JUNE, 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 4 OF 5

GENERAL NOTES:

1. DRAWING SHALL NOT BE USED FOR STRUCTURAL, ARCHITECTURAL, UTILITY, OR OTHER REFERENCE EXCEPT FOR THE SUB-SLAB DEPRESSURIZATION SYSTEM.
2. SYSTEM INSTALLATION SHALL ADHERE TO: OCTOBER 2006 FINAL GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK PREPARED BY NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) AND ALL APPLICABLE PORTIONS OF THE LOCAL BUILDING CODES.
3. EXHAUST STACKS SHALL BE SECURELY ANCHORED WITH ADEQUATE STRUCTURAL SUPPORTS.
4. VENT AND RISER PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE LOCAL PLUMBING CODE.
5. UNLESS OTHERWISE SPECIFIED, ALL RISER PIPING SHALL BE CONSTRUCTED OF 4-INCH CAST IRON PIPE.
6. ALL CONNECTIONS AT PIPE FITTINGS AND JOINTS SHALL BE LEAK FREE. THIS SHALL BE DEMONSTRATED BY THE PERFORMANCE OF A POSITIVE 5 POUNDS PER SQUARE INCH (PSI) (MIN.) PRESSURE TEST AND SMOKE TEST FOLLOWING PIPE/FITTINGS ASSEMBLY BY THE CONTRACTOR.
7. RISER PIPE SHALL BE PERMANENTLY IDENTIFIED WITHIN EACH FLOOR LEVEL. BACKGROUND SHALL BE SAFETY BLUE WITH WHITE LETTERING. LETTERING SHALL READ:

   "CAUTION: DO NOT ALTER.
   SUBSURFACE VAPOR VENT PIPE, HEADER #."

8. ALL EXTERNAL PIPES OR PIPES EXPOSED TO MOISTURE AND METAL SYSTEM COMPONENTS SHALL BE PAINTED WITH A CORROSION RESISTANT COATING.
9. INSTALLATION OF THE SUB-SLAB COMPONENTS AND VENT AND RISER PIPING, FANS AND ROOF PENETRATIONS MUST BE COORDINATED WITH THE ENGINEER/GZA.
10. RISER PIPE FROM SUB-SLAB TO ROOF SHALL BE COORDINATED WITH THE ENGINEER/GZA. RISER PIPE SHALL BE EXTENDED TO THE ROOF WITH MINIMAL CHANGES IN DIRECTION.
11. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF ALL EQUIPMENT, DUCT WORK, MONITORING POINT LOCATIONS FOR APPROVAL BY THE ENGINEER/GZA BEFORE CONSTRUCTION.
12. THE SUB-SLAB DEPRESSURIZATION SYSTEM IS NOT A " HAZARDOUS EXHAUST SYSTEM" AS DEFINED BY THE 2008 NYC MECHANICAL CODE SECTION 510.

BLOWER NOTES:

1. THE SUCTION FAN SCHEMATICS ARE SHOWN TO ILLUSTRATE THE REQUIRED COMPONENTS AND THE GENERAL LOCATIONS IN THE PIPING RUN AND SHALL NOT BE CONSIDERED TO BE ACCURATE. THE ACTUAL CONFIGURATION AND DIMENSIONS OF THE SUCTION FAN ASSEMBLY WILL VARY BASED ON MANUFACTURING METHODS AND FIELD CONDITIONS. FINAL DESIGN AND SUCTION FAN SYSTEM SELECTED ARE SUBJECT TO APPROVAL. CONTRACTOR SHALL PROVIDE ALL SUCTION FAN SPECIFICATIONS AND CUT SHEETS FOR APPROVAL PRIOR TO INSTALLATION.
2. A DIFFERENTIAL PRESSURE SWITCH SHALL BE INSTALLED ON EACH RISER PIPE BEFORE EACH SUCTION FAN.
3. SUCTION FAN MOTOR WILL REQUIRE A THREE-PHASE, 60HZ, 230 OR 208 VOLT POWER SUPPLY. COORDINATE POWER SUPPLIES WITH BUILDING POWER FLOOR PLAN. COORDINATE POWER SUPPLY FOR FLOW METER AT RISER THROUGH FLOOR SLAB.
4. CONTRACTOR TO PROVIDE CONNECTION TO GROUNDING FOR ROOF TOP FANS.

ELECTRICAL NOTES:

1. FURNISH AND INSTALL ALL NECESSARY CABLE SUPPORT BOXES, PULL BOXES AND CONDUIT SUPPORTS, WHERE NOTED AS REQUIRED BY APPLICABLE CODES. ALL CONDUITS THAT HAVE RUNS IN EXCESS OF 180 DEGREES SHALL BE PROVIDED WITH PULL BOX.
2. NO ELECTRICAL CONNECTIONS SHALL BE MADE TO, OR WORK PERFORMED ON ENERGIZED EQUIPMENT. LICENSED ELECTRICIANS TO MAKE ALL FINAL CONNECTIONS TO EQUIPMENT.
3. CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS OF ALL EXISTING AND NEW EQUIPMENT TO BE USED.
4. PREPARE AND FURNISH TO THE OWNER RECORD PLANS FOR ALL WORK INSTALLED.
5. MITIGATION ALARM SYSTEM TO BE COORDINATED BY THE ENGINEER/GZA FOR APPROPRIATE PLACEMENT.

ROOFING NOTES:

1. ALL ROOF CONSTRUCTION TO BE COORDINATED BY CONTRACTOR TO PROVIDE PROTECTION OF BUILDING AT ALL TIMES.
2. THE CONTRACTOR IS RESPONSIBLE FOR WEATHER-TIGHT PROTECTION OF ROOFING AT ALL TIMES DURING THE WORK OF THIS CONTRACT. THE CONTRACTOR SHALL PROTECT CUT PORTIONS OF THE ROOF. REMOVE TEMPORARY PROTECTION PRIOR TO INSTALLATION OF BASE SHEETS AND PERMANENTLY SEAL THE ROOF PENETRATIONS.
3. THE CONTRACTOR SHALL PROVIDE A 2-YEAR WARRANTY ON WATER LEAKS AT THE ROOF PENETRATIONS.

CONCRETE NOTES;

1. DISTURBANCE SHALL BE KEPT LIMITED TO THE AREA OF WORK.
2. SAWCUTTING OF CONCRETE SHOULD BE KEPT TO A MINIMUM.
3. SURFACE DAMAAGED DURING THE INSTALLATION OF THE SUBSLAB SYSTEM SHALL BE RESTORED TO ITS ORIGINAL CONDITION.
4. RESTORE CONCRETE WITH MINIMUM 4,000 PSI CONCRETE STRENGTH.
5. CONTRACTOR SHALL CONTROL DUST WHILE SAWCUTTING CONCRETE.

0 #' #' #' #'
SCALE IN FEET 1" = #'

NO.	ISSUE/DESCRIPTION	BY	DATE

ERNEST R. HANNA

NY PROFESSIONAL ENGINEER
LICENSE #: 065440

FULL SCALE SSD SYSTEM DESIGN REPORT -
SLOOP BREWERY

FULL SCALE SSD SYSTEM CONSTRUCTION NOTES

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental of NY Engineers and Scientists www.gza.com		I.PARK84, LLC. GREENWICH, CT	
PROJ MGR: MH	REVIEWED BY: DW	CHECKED BY: EH	FIGURE 5
DESIGNED BY: BR	DRAWN BY: PB	SCALE: 1" = 15'	
DATE: JUNE, 2019	PROJECT NO. 12.0076252.10	REVISION NO.	SHEET NO. 5 OF 5

Appendices

Appendix A

Full Scale SSD System Calculations

APPENDIX B
FULL SCALE SSD SYSTEM CALCULATIONS
Full Scale SSD System Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, NEw York, 12533

VEP: GZA-EP-1

1) Radius of Influence Optimization (Cutoff = #0.004 IW)

Step	Applied Vacuum (IW)	Radius of Influence (ft)	Calculated ROI (ft)	Residuals	Squared Residuals	$ROI-ROI_{avg}$	$(ROI-ROI_{avg})^2$
1	12.8	35	34.5	0.00	0.00	5.50	30.20
2	5	26	26.3	0.00	0.00	-2.68	7.18
3	2	26	26.2	0.00	0.00	-2.82	7.93
Average	6.61	29	29	**∑SR =**	0.00	**∑SM =**	45.31

Radius of Influence vs. Applied Vacuum is fitted using quadratic relationship **Fit (R^2 =** 1.00

ROI = b * (Applied Vacuum)^2 + a * (Applied Vacuum) + c

a =	**-0.5990**
b =	**0.0921**
c =	**27.0274**

Optimum occurs at $\delta(ROI)/\delta V=0$, thus V_{opt} = -a /(2b)

Applied Vacuum Opt (IW) = ***3.25***

Project ROI that corresponds to Optimal Vacuum from ROI vs. Vacuum relationship

ROI Opt (ft) = ***26.05***

2) Flow Rate Optimization (Applied Vacuum = #XX IW)

Step	Applied Vacuum (IW)	Flow Rate (cfm)	Calculated Flow Rate (cfm)	Residuals	Squared Residuals	$Q-Q_{avg}$	$(Q-Q_{avg})^2$
1	12.8	45.3	43	-2.70	7.29	19.15	367
2	5	22.2	20	-2.70	7.29	-3.94	16
3	2	11.0	8	-2.70	7.29	-15.21	231
Average Flow Rate (cfm) =		26.16		**∑SR =**	21.87	**∑SM =**	613.65

Flow Rate vs. Applied Vacuum is fitted with qudratic empirical relationship Fit (R^2 = 0.96

Flow Rate = b * (Applied Vacuum)^2 + a * Applied Vacuum + c

a =	***4.275***
b =	***-0.074***
c =	***2.700***

Project Flow Rate that corresponds to Optimal Vacuum from Flow Rate vs. Vacuum relationship

Flow Rate Opt (cfm) = ***15.81***

3) Pilot Test Results

ROI opt (ft.)	***26.05***
Applied Vacuum opt (IW)	***3.25***
Flow Rate opt (cfm)	***15.81***

4) Full-Scale Design Parameters

4a) Estimate Applied Vacuum for Design ROI for Each Extraction Point

Design ROI (ft.) = ***35***

Radius of Influence vs. Applied Vacuum fitted using linear relationship using the pilot test data

m =	**0.8230**
b =	**23.5733**
R2	**0.9354**

Applied Vacuum (IW) = ***14***

Adjusted Down Applied Vacuum (IW) = ***10*** Due to incresed efficiency by changing the dimensions of the extraction point

4b) Estimate Flow Rate for each Extraction Point

Flow Rate vs. Applied Vacuum is fitted with qudratic empirical relationship using the pilot test data

Flow Rate = b * (Applied Vacuum)^2 + a * Applied Vacuum + c

a =	***4.275***
b =	***-0.074***
c =	***2.700***

Flow Rate that Corresponds to Applied Vacuum from Flow Rate vs. Vacuum relationship for Each Extraction Point

Flow Rate (cfm) = ***39.15***

4c) Full-Scale Design Parameters for each Extraction Point

ROI (ft.)	***35.00***
Applied Vacuum (IW)	***10.41***
Flow Rate (cfm)	***39.15***

APPENDIX B
FULL SCALE SSD SYSTEM CALCULATIONS
Full Scale SSD System Design Report - Sloop Brewery
2070 Route 52
Hopewell Junction, New York, 12533

VEP: GZA-EP-2

1) Radius of Influence Optimization (Cutoff = #0.004 IW)

Step	Applied Vacuum (IW)	Radius of Influence (ft)	Calculated ROI (ft)	Residuals	Squared Residuals	$ROI-ROI_{avg}$	$(ROI-ROI_{avg})^2$
1	36.5	38	38.4	0.00	0.00	11.86	140.7
2	23	24	24.4	0.00	0.00	-2.1	4.4
3	4.1	17	16.8	0.00	0.00	-9.8	95.1
Average	21.2	27	27	**∑SR =**	0.00	**∑SM =**	240.3

Radius of Influence vs. Applied Vacuum is fitted using quadratic relationship **Fit (R^2 =** 1.00

ROI = b * (Applied Vacuum)^2 + a * (Applied Vacuum) + c

a **=**	**-0.1229**
b **=**	**0.0195**
c **=**	**16.9605**

Optimum occurs at d(ROI)/dV=0, thus V_{opt} = -a /(2b)

Applied Vacuum Opt (IW) = ***3.16***

Project ROI that corresponds to Optimal Vacuum from ROI vs. Vacuum relationship

ROI Opt (ft) = ***16.77***

2) Flow Rate Optimization (Applied Vacuum = #28.50 IW)

Step	Applied Vacuum (IW)	Flow Rate (cfm)	Calculated Flow Rate (cfm)	Residuals	Squared Residuals	$Q-Q_{avg}$	$(Q-Q_{avg})^2$
1	36.5	37.1	28	-8.69	75.48	14.81	219
2	23	20.4	12	-8.69	75.48	-1.81	3
3	4.07	9.2	1	-8.69	75.48	-13.00	169
Average Flow Rate (cfm) =		22.2		**∑SR =**	226.5	**∑SM =**	391.6

Flow Rate vs. Applied Vacuum is fitted with qudratic empirical relationship Fit (R^2 = 0.42

Flow Rate = b * (Applied Vacuum)^2 + a * Applied Vacuum + c

a **=**	***0.056***
b **=**	***0.020***
c **=**	***8.688***

Project Flow Rate that corresponds to Optimal Vacuum from Flow Rate vs. Vacuum relationship

Flow Rate Opt (cfm) = ***9.06***

3) Pilot Test Results

ROI opt (ft.)	***16.77***
Applied Vacuum opt (IW)	***3.16***
Flow Rate opt (cfm)	***9.06***

4) Full-Scale Design Parameters

4a) Estimate Applied Vacuum for Design ROI for Each Extraction Point

Design ROI (ft.) = ***30***

Radius of Influence vs. Applied Vacuum fitted using linear relationship using the pilot test data

m **=**	**0.6495**
b **=**	**12.7741**
R2	**0.9320**

Applied Vacuum (IW) =	***27***
Adjusted Down Applied Vacuum (IW) =	***19***

Due to incresed efficiency by changing the dimensions of the extraction point

4b) Estimate Flow Rate for each Extraction Point

Flow Rate vs. Applied Vacuum is fitted with qudratic empirical relationship using the pilot test data

Flow Rate = b * (Applied Vacuum)^2 + a * Applied Vacuum + c

a **=**	***0.056***
b **=**	***0.020***
c **=**	***8.688***

Flow Rate that Corresponds to Applied Vacuum from Flow Rate vs. Vacuum relationship for Each Extraction Point

Flow Rate (cfm) = ***16.54***

4c) Full-Scale Design Parameters for each Extraction Point

ROI (ft.)	***30.00***
Applied Vacuum (IW)	***18.57***
Flow Rate (cfm)	***16.54***

Appendix B

Air Sample Laboratory Package

ANALYTICAL REPORT

Lab Number:	L1918329
Client:	GZA GeoEnvironmental, Inc. 55 Lane Road Suite 407 Fairfield, NJ 07004
ATTN:	Bhuvnesh Parekh
Phone:	(973) 774-3300
Project Name:	SLOOP BREWERY PILOT
Project Number:	12.0076252.10
Report Date:	05/09/19

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1918329-01	AMBIENT-1	AIR	EAST FISHKILL, NY	05/01/19 13:50	05/02/19
L1918329-02	AMBIENT-2	AIR	EAST FISHKILL, NY	05/01/19 13:52	05/02/19
L1918329-03	IA-001	AIR	EAST FISHKILL, NY	05/01/19 13:44	05/02/19
L1918329-04	SV-001	SOIL_VAPOR	EAST FISHKILL, NY	05/01/19 14:03	05/02/19

Project Name:	SLOOP BREWERY PILOT	**Lab Number:**	L1918329
Project Number:	12.0076252.10	**Report Date:**	05/09/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	SLOOP BREWERY PILOT	**Lab Number:**	L1918329
Project Number:	12.0076252.10	**Report Date:**	05/09/19

Case Narrative (continued)

Volatile Organics in Air

Canisters were released from the laboratory on April 29, 2019. The canister certification results are provided as an addendum.

The WG1233409-3 LCS recoveries for propylene (160%), butane (133%) and bromoform (135%) are above the upper 130% acceptance limit. All samples associated with this LCS do not have reportable amounts of these analytes.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Christopher J. Anderson

Title: Technical Director/Representative Date: 05/09/19

AIR

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-01
Client ID: AMBIENT-1
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:50
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 05/03/19 18:25
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.542	0.200	--	2.68	0.989	--		1
Chloromethane	0.663	0.200	--	1.37	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	3.49	1.00	--	8.29	2.38	--		1
Trichlorofluoromethane	0.255	0.200	--	1.43	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	0.538	0.500	--	1.87	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	0.536	0.500	--	1.58	1.47	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	1.66	0.500	--	4.90	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-01
Client ID: AMBIENT-1
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:50
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
n-Hexane	ND	0.200	--	ND	0.705	--		1
Benzene	0.210	0.200	--	0.671	0.639	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	0.306	0.200	--	1.15	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-01
Client ID: AMBIENT-1
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:50
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	94		60-140
Bromochloromethane	94		60-140
chlorobenzene-d5	93		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-01
Client ID: AMBIENT-1
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:50
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 05/03/19 18:25
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	0.088	0.020	--	0.554	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	0.028	0.020	--	0.190	0.136	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	94		60-140
bromochloromethane	94		60-140
chlorobenzene-d5	94		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-02
Client ID: AMBIENT-2
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:52
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 05/03/19 19:04
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.542	0.200	--	2.68	0.989	--		1
Chloromethane	0.655	0.200	--	1.35	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	1.95	1.00	--	4.63	2.38	--		1
Trichlorofluoromethane	0.234	0.200	--	1.31	1.12	--		1
Isopropanol	1.23	0.500	--	3.02	1.23	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-02
Client ID: AMBIENT-2
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:52
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
n-Hexane	ND	0.200	--	ND	0.705	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-02
Client ID: AMBIENT-2
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:52
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	91		60-140
Bromochloromethane	92		60-140
chlorobenzene-d5	89		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-02
Client ID: AMBIENT-2
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:52
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 05/03/19 19:04
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	0.079	0.020	--	0.497	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	91		60-140
bromochloromethane	91		60-140
chlorobenzene-d5	91		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-03
Client ID: IA-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:44
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 05/04/19 03:27
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	0.514	0.200	--	2.54	0.989	--		1
Chloromethane	0.600	0.200	--	1.24	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	3.38	1.00	--	8.03	2.38	--		1
Trichlorofluoromethane	0.822	0.200	--	4.62	1.12	--		1
Isopropanol	11.8	0.500	--	29.0	1.23	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-03
Client ID: IA-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:44
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
n-Hexane	ND	0.200	--	ND	0.705	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-03
Client ID: IA-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:44
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	90		60-140
Bromochloromethane	93		60-140
chlorobenzene-d5	89		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-03
Client ID: IA-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 13:44
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 05/04/19 03:27
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	0.080	0.020	--	0.503	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	0.088	0.020	--	0.597	0.136	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	89		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	89		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-04
Client ID: SV-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 14:03
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil_Vapor
Anaytical Method: 48,TO-15
Analytical Date: 05/07/19 22:29
Analyst: RY

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Dichlorodifluoromethane	1.81	0.200	--	8.95	0.989	--		1
Chloromethane	0.616	0.200	--	1.27	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	13.9	1.00	--	33.0	2.38	--		1
Trichlorofluoromethane	3.21	0.200	--	18.0	1.12	--		1
Isopropanol	12.0	0.500	--	29.5	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	1.55	0.500	--	4.70	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	0.226	0.200	--	1.73	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	4.64	0.500	--	13.7	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-04
Client ID: SV-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 14:03
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	5.73	0.500	--	16.9	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	0.857	0.200	--	4.61	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	2.83	0.200	--	10.7	0.754	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	10.2	0.200	--	69.2	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	0.276	0.200	--	1.20	0.869	--		1
p/m-Xylene	1.18	0.400	--	5.13	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-04
Client ID: SV-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 14:03
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	0.527	0.200	--	2.29	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	0.713	0.200	--	3.51	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	84		60-140
Bromochloromethane	83		60-140
chlorobenzene-d5	86		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

SAMPLE RESULTS

Lab ID: L1918329-04
Client ID: SV-001
Sample Location: EAST FISHKILL, NY

Date Collected: 05/01/19 14:03
Date Received: 05/02/19
Field Prep: Not Specified

Sample Depth:
Matrix: Soil_Vapor
Anaytical Method: 48,TO-15
Analytical Date: 05/09/19 03:32
Analyst: TS

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Hexanone	0.317	0.200	--	1.30	0.820	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	84		60-140
Bromochloromethane	87		60-140
chlorobenzene-d5	83		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15-SIM
Analytical Date: 05/03/19 15:53

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-03 Batch: WG1233407-4								
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/03/19 15:14

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-03 Batch: WG1233409-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/03/19 15:14

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-03 Batch: WG1233409-4								
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/03/19 15:14

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-03 Batch: WG1233409-4								
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
Report Date: 05/09/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/07/19 16:46

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1234587-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10
Lab Number: L1918329
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Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/07/19 16:46

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1234587-4								
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1

Project Name: SLOOP BREWERY PILOT
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Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/07/19 16:46

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1234587-4								
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Project Name: SLOOP BREWERY PILOT
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Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/08/19 14:51

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1235024-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1

Project Name: SLOOP BREWERY PILOT
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Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/08/19 14:51

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1235024-4								
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1

Project Name: SLOOP BREWERY PILOT
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Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 05/08/19 14:51

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 04 Batch: WG1235024-4								
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-03 Batch: WG1233407-3								
Vinyl chloride	112		-		70-130	-		25
1,1-Dichloroethene	102		-		70-130	-		25
cis-1,2-Dichloroethene	97		-		70-130	-		25
1,1,1-Trichloroethane	98		-		70-130	-		25
Carbon tetrachloride	113		-		70-130	-		25
Trichloroethene	99		-		70-130	-		25
Tetrachloroethene	102		-		70-130	-		25

Lab Control Sample Analysis
Batch Quality Control

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-03 Batch: WG1233409-3								
Propylene	**160**	Q	-		70-130	-		
Dichlorodifluoromethane	109		-		70-130	-		
Chloromethane	117		-		70-130	-		
Freon-114	115		-		70-130	-		
Vinyl chloride	116		-		70-130	-		
1,3-Butadiene	106		-		70-130	-		
Bromomethane	108		-		70-130	-		
Chloroethane	112		-		70-130	-		
Vinyl bromide	99		-		70-130	-		
Acetone	97		-		40-160	-		
Trichlorofluoromethane	94		-		70-130	-		
Isopropanol	102		-		40-160	-		
1,1-Dichloroethene	105		-		70-130	-		
Tertiary butyl Alcohol	77		-		70-130	-		
Methylene chloride	112		-		70-130	-		
3-Chloropropene	129		-		70-130	-		
Carbon disulfide	100		-		70-130	-		
Freon-113	106		-		70-130	-		
trans-1,2-Dichloroethene	100		-		70-130	-		
1,1-Dichloroethane	104		-		70-130	-		
Methyl tert butyl ether	90		-		70-130	-		
Vinyl acetate	129		-		70-130	-		
2-Butanone	120		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-03 Batch: WG1233409-3								
cis-1,2-Dichloroethene	103		-		70-130	-		
Ethyl Acetate	118		-		70-130	-		
Chloroform	99		-		70-130	-		
Tetrahydrofuran	108		-		70-130	-		
1,2-Dichloroethane	94		-		70-130	-		
n-Hexane	100		-		70-130	-		
1,1,1-Trichloroethane	96		-		70-130	-		
Benzene	98		-		70-130	-		
Carbon tetrachloride	112		-		70-130	-		
Cyclohexane	106		-		70-130	-		
1,2-Dichloropropane	115		-		70-130	-		
Bromodichloromethane	104		-		70-130	-		
1,4-Dioxane	100		-		70-130	-		
Trichloroethene	101		-		70-130	-		
2,2,4-Trimethylpentane	110		-		70-130	-		
Heptane	119		-		70-130	-		
cis-1,3-Dichloropropene	110		-		70-130	-		
4-Methyl-2-pentanone	118		-		70-130	-		
trans-1,3-Dichloropropene	92		-		70-130	-		
1,1,2-Trichloroethane	111		-		70-130	-		
Toluene	104		-		70-130	-		
2-Hexanone	116		-		70-130	-		
Dibromochloromethane	125		-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-03 Batch: WG1233409-3								
1,2-Dibromoethane	112		-		70-130	-		
Tetrachloroethene	100		-		70-130	-		
Chlorobenzene	107		-		70-130	-		
Ethylbenzene	110		-		70-130	-		
p/m-Xylene	110		-		70-130	-		
Bromoform	**135**	Q	-		70-130	-		
Styrene	108		-		70-130	-		
1,1,2,2-Tetrachloroethane	118		-		70-130	-		
o-Xylene	114		-		70-130	-		
4-Ethyltoluene	108		-		70-130	-		
1,3,5-Trimethylbenzene	112		-		70-130	-		
1,2,4-Trimethylbenzene	114		-		70-130	-		
Benzyl chloride	118		-		70-130	-		
1,3-Dichlorobenzene	107		-		70-130	-		
1,4-Dichlorobenzene	106		-		70-130	-		
1,2-Dichlorobenzene	109		-		70-130	-		
1,2,4-Trichlorobenzene	100		-		70-130	-		
Hexachlorobutadiene	109		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1234587-3								
Propylene	129		-		70-130	-		
Dichlorodifluoromethane	91		-		70-130	-		
Chloromethane	112		-		70-130	-		
Freon-114	101		-		70-130	-		
Vinyl chloride	95		-		70-130	-		
1,3-Butadiene	98		-		70-130	-		
Bromomethane	95		-		70-130	-		
Chloroethane	96		-		70-130	-		
Vinyl bromide	100		-		70-130	-		
Acetone	85		-		40-160	-		
Trichlorofluoromethane	81		-		70-130	-		
Isopropanol	102		-		40-160	-		
1,1-Dichloroethene	88		-		70-130	-		
Tertiary butyl Alcohol	70		-		70-130	-		
Methylene chloride	115		-		70-130	-		
3-Chloropropene	117		-		70-130	-		
Carbon disulfide	103		-		70-130	-		
Freon-113	103		-		70-130	-		
trans-1,2-Dichloroethene	88		-		70-130	-		
1,1-Dichloroethane	92		-		70-130	-		
Methyl tert butyl ether	94		-		70-130	-		
Vinyl acetate	127		-		70-130	-		
2-Butanone	120		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1234587-3								
cis-1,2-Dichloroethene	94		-		70-130	-		
Ethyl Acetate	110		-		70-130	-		
Chloroform	93		-		70-130	-		
Tetrahydrofuran	110		-		70-130	-		
1,2-Dichloroethane	85		-		70-130	-		
n-Hexane	93		-		70-130	-		
1,1,1-Trichloroethane	96		-		70-130	-		
Benzene	96		-		70-130	-		
Carbon tetrachloride	108		-		70-130	-		
Cyclohexane	95		-		70-130	-		
1,2-Dichloropropane	110		-		70-130	-		
Bromodichloromethane	97		-		70-130	-		
1,4-Dioxane	96		-		70-130	-		
Trichloroethene	103		-		70-130	-		
2,2,4-Trimethylpentane	98		-		70-130	-		
Heptane	124		-		70-130	-		
cis-1,3-Dichloropropene	107		-		70-130	-		
4-Methyl-2-pentanone	121		-		70-130	-		
trans-1,3-Dichloropropene	89		-		70-130	-		
1,1,2-Trichloroethane	110		-		70-130	-		
Toluene	116		-		70-130	-		
2-Hexanone	**134**	Q	-		70-130	-		
Dibromochloromethane	**138**	Q	-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1234587-3								
1,2-Dibromoethane	122		-		70-130	-		
Tetrachloroethene	113		-		70-130	-		
Chlorobenzene	115		-		70-130	-		
Ethylbenzene	119		-		70-130	-		
p/m-Xylene	118		-		70-130	-		
Bromoform	**149**	Q	-		70-130	-		
Styrene	119		-		70-130	-		
1,1,2,2-Tetrachloroethane	119		-		70-130	-		
o-Xylene	122		-		70-130	-		
4-Ethyltoluene	117		-		70-130	-		
1,3,5-Trimethylbenzene	121		-		70-130	-		
1,2,4-Trimethylbenzene	124		-		70-130	-		
Benzyl chloride	120		-		70-130	-		
1,3-Dichlorobenzene	116		-		70-130	-		
1,4-Dichlorobenzene	116		-		70-130	-		
1,2-Dichlorobenzene	121		-		70-130	-		
1,2,4-Trichlorobenzene	107		-		70-130	-		
Hexachlorobutadiene	120		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

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Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1235024-3								
Propylene	126		-		70-130	-		
Dichlorodifluoromethane	89		-		70-130	-		
Chloromethane	106		-		70-130	-		
Freon-114	103		-		70-130	-		
Vinyl chloride	103		-		70-130	-		
1,3-Butadiene	107		-		70-130	-		
Bromomethane	92		-		70-130	-		
Chloroethane	108		-		70-130	-		
Vinyl bromide	94		-		70-130	-		
Acetone	84		-		40-160	-		
Trichlorofluoromethane	99		-		70-130	-		
Isopropanol	92		-		40-160	-		
1,1-Dichloroethene	99		-		70-130	-		
Tertiary butyl Alcohol	92		-		70-130	-		
Methylene chloride	98		-		70-130	-		
3-Chloropropene	103		-		70-130	-		
Carbon disulfide	88		-		70-130	-		
Freon-113	93		-		70-130	-		
trans-1,2-Dichloroethene	96		-		70-130	-		
1,1-Dichloroethane	99		-		70-130	-		
Methyl tert butyl ether	97		-		70-130	-		
Vinyl acetate	106		-		70-130	-		
2-Butanone	105		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1235024-3								
cis-1,2-Dichloroethene	103		-		70-130	-		
Ethyl Acetate	105		-		70-130	-		
Chloroform	97		-		70-130	-		
Tetrahydrofuran	100		-		70-130	-		
1,2-Dichloroethane	100		-		70-130	-		
n-Hexane	113		-		70-130	-		
1,1,1-Trichloroethane	107		-		70-130	-		
Benzene	107		-		70-130	-		
Carbon tetrachloride	105		-		70-130	-		
Cyclohexane	115		-		70-130	-		
1,2-Dichloropropane	115		-		70-130	-		
Bromodichloromethane	108		-		70-130	-		
1,4-Dioxane	110		-		70-130	-		
Trichloroethene	100		-		70-130	-		
2,2,4-Trimethylpentane	117		-		70-130	-		
Heptane	117		-		70-130	-		
cis-1,3-Dichloropropene	114		-		70-130	-		
4-Methyl-2-pentanone	120		-		70-130	-		
trans-1,3-Dichloropropene	98		-		70-130	-		
1,1,2-Trichloroethane	107		-		70-130	-		
Toluene	92		-		70-130	-		
2-Hexanone	108		-		70-130	-		
Dibromochloromethane	90		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 04 Batch: WG1235024-3								
1,2-Dibromoethane	91		-		70-130	-		
Tetrachloroethene	85		-		70-130	-		
Chlorobenzene	93		-		70-130	-		
Ethylbenzene	95		-		70-130	-		
p/m-Xylene	96		-		70-130	-		
Bromoform	86		-		70-130	-		
Styrene	94		-		70-130	-		
1,1,2,2-Tetrachloroethane	98		-		70-130	-		
o-Xylene	98		-		70-130	-		
4-Ethyltoluene	94		-		70-130	-		
1,3,5-Trimethylbenzene	94		-		70-130	-		
1,2,4-Trimethylbenzene	100		-		70-130	-		
Benzyl chloride	91		-		70-130	-		
1,3-Dichlorobenzene	90		-		70-130	-		
1,4-Dichlorobenzene	91		-		70-130	-		
1,2-Dichlorobenzene	90		-		70-130	-		
1,2,4-Trichlorobenzene	99		-		70-130	-		
Hexachlorobutadiene	96		-		70-130	-		

Project Name: SLOOP BREWERY PILOT

Project Number: 12.0076252.10

Lab Number: L1918329

Report Date: 05/09/19

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1918329-01	AMBIENT-1	0805	Flow 4	04/29/19	290717		-	-	-	Pass	72	69	4
L1918329-01	AMBIENT-1	2826	2.7L Can	04/29/19	290717	L1916517-02	Pass	-29.6	-3.9	-	-	-	-
L1918329-02	AMBIENT-2	0232	Flow 4	04/29/19	290717		-	-	-	Pass	65	46	34
L1918329-02	AMBIENT-2	247	2.7L Can	04/29/19	290717	L1916517-01	Pass	-29.5	-7.1	-	-	-	-
L1918329-03	IA-001	0381	Flow 1	04/29/19	290717		-	-	-	Pass	72	78	8
L1918329-03	IA-001	2606	2.7L Can	04/29/19	290717	L1916517-02	Pass	-29.3	-2.2	-	-	-	-
L1918329-04	SV-001	0947	Flow 2	04/29/19	290717		-	-	-	Pass	72	81	12
L1918329-04	SV-001	2599	2.7L Can	04/29/19	290717	L1916517-01	Pass	-29.1	-4.0	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 04/23/19 18:53
Analyst: TS

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
Xylenes, total	ND	0.600	--	ND	0.869	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,2-Dichloroethene (total)	ND	1.00	--	ND	1.00	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	91		60-140
Bromochloromethane	90		60-140
chlorobenzene-d5	89		60-140

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1916517

Project Number: CANISTER QC BAT **Report Date:** 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 04/23/19 18:53
Analyst: TS

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.100	--	ND	0.264	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.100	--	ND	0.461	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-01
Client ID: CAN 2180 SHELF 2
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	91		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	92		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 04/23/19 19:32
Analyst: TS

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.500	--	ND	0.902	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	5.00	--	ND	9.42	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	1.00	--	ND	3.52	--		1
Xylenes, total	ND	0.600	--	ND	0.869	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.500	--	ND	1.47	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,2-Dichloroethene (total)	ND	1.00	--	ND	1.00	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	91		60-140
Bromochloromethane	89		60-140
chlorobenzene-d5	88		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1916517
Report Date: 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 04/23/19 19:32
Analyst: TS

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.100	--	ND	0.264	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	0.500	--	ND	1.74	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1916517

Project Number: CANISTER QC BAT **Report Date:** 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.100	--	ND	0.461	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
4-Ethyltoluene	ND	0.020	--	ND	0.098	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1916517

Project Number: CANISTER QC BAT **Report Date:** 05/09/19

Air Canister Certification Results

Lab ID: L1916517-02
Client ID: CAN 2200 SHELF 9
Sample Location:

Date Collected: 04/22/19 16:00
Date Received: 04/23/19
Field Prep: Not Specified

Sample Depth:

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	91		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	91		60-140

Project Name: SLOOP BREWERY PILOT
Project Number: 12.0076252.10

Lab Number: L1918329
Report Date: 05/09/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
N/A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1918329-01A	Canister - 2.7 Liter	N/A	NA			Y	Absent		TO15-LL(30),TO15-SIM(30)
L1918329-02A	Canister - 2.7 Liter	N/A	NA			Y	Absent		TO15-LL(30),TO15-SIM(30)
L1918329-03A	Canister - 2.7 Liter	N/A	NA			Y	Absent		TO15-LL(30),TO15-SIM(30)
L1918329-04A	Canister - 2.7 Liter	N/A	NA			Y	Absent		TO15-LL(30)

*Values in parentheses indicate holding time in days

Project Name:	SLOOP BREWERY PILOT	**Lab Number:**	L1918329
Project Number:	12.0076252.10	**Report Date:**	05/09/19

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: Data Usability Report

Project Name:	SLOOP BREWERY PILOT	**Lab Number:**	L1918329
Project Number:	12.0076252.10	**Report Date:**	05/09/19

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

REFERENCES

48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

AIR ANALYSIS

PAGE 1 OF 1

CHAIN OF CUSTODY

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 5/3/19

ALPHA Job #: L1918329

Client Information

Client: GZA
Address: 55 LANE ROAD St. 401
Fairfield NJ 07004
Phone: 973-774-3300
Fax: 973-774-3350
Email: benjamin.lonagnol@gza.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Sloop Brewery Pilot
Project Location: East Fishkill, NY
Project #: 17.0076252.10
Project Manager: BT Parekh
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☐ ADEx
Criteria Checker:
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☐ Additional Deliverables:
Report to: (if different than Project Manager)

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Res / Comm

Other Project Specific Requirements/Comments:

Project-Specific Target Compound List: ☐

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	COLLECTION End Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-15	TO-15 SIM	APH (Subject Non-petroleum HCs ☐)	Fixed Gases	Sulfides & Mercaptans by TO-15	Sample Comments (i.e. PID)
18329.01	Ambient - 1	5/1/19	13:16	13:50	-29.6	-4.60	AA	BR	2.7L	3826	0805	X					* DO NOT TEST FOR ETHANOL
.02	Ambient - 2	5/1/19	13:16	13:52	-29.5	-4.95	AA	BR	2.7L	247	0232	X					
.03	IA - 001	5/1/19	13:15	13:44	-29.3	-2.72	AA	BR	2.7L	2606	0381	X					
.04	SV - 001	5/1/19	13:15	14:03	-29.1	-4.36	SV	BR	2.7L	2549	0947	X					

*SAMPLE MATRIX CODES

AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

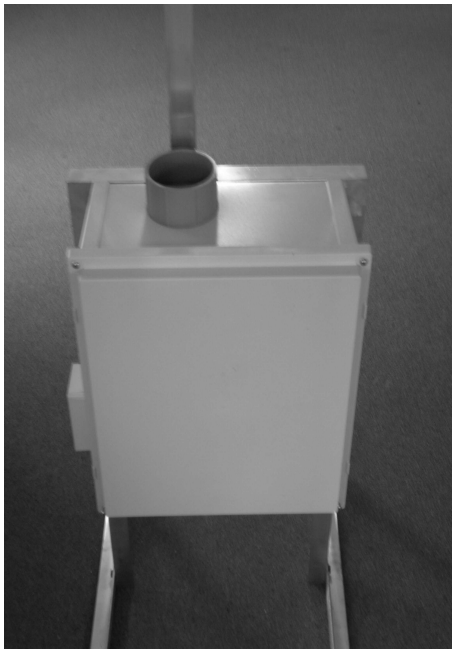
Relinquished By:	Date/Time	Received By:	Date/Time:
Ben Renagnol	5/2/19 1115	AAL	5/2/19 1115
	5/2/19 1730		
	05/03/19 0655		05/03/19 0200
			5/3/19 0655

Appendix C

Full Scale SSD System Blower Specifications

THE OBAR GBR89
COMPACT RADIAL BLOWER

Based on 25 years of experience and 2 years of research and development, the patent pending GBR series of compact radial blowers provide the perfect combination of performance and design.



GBR89 WITH ROOF MOUNT

PERFORMANCE

- GBR89 HA 14” WC at 100CFM max flow 500 CFM.
- Built in speed control to customize performance.
- Condensate bypass built in.
- 18 month warranty 40,000 hr sealed bearings.

DESIGN

- Our modular design means the blower and manifold assembly can be removed and replaced as a unit. This makes repairs cost effective and easy and allows contractors to upgrade systems simply by swapping assemblies.
- The GBR series is based on a bypass blower designed to handle combustible materials.
- The housing is not required to be air tight so you can add gauges and alarms without compromising the system.
- Built in condensate bypass.
- Built in speed control.
- Quick disconnect electrical harness.
- All UL listed components including UL listed enclosure for outside use.
- Wall fastening lugs included.
- GBR series roof and wall mounts available to quickly configure the blowers for your installation while providing a custom built look.
- Compact design 18”x 16”x 10” weighing only 18 lbs.
- 4” schedule 40 inlet and 6” schedule 40 exhaust.

Enclosure Specifications
Rating:

Ingress Protection (EN 60529): 66/67

Electrical insulation: Totally insulated

Halogen free (DIN/VDE 0472, Part 815): yes

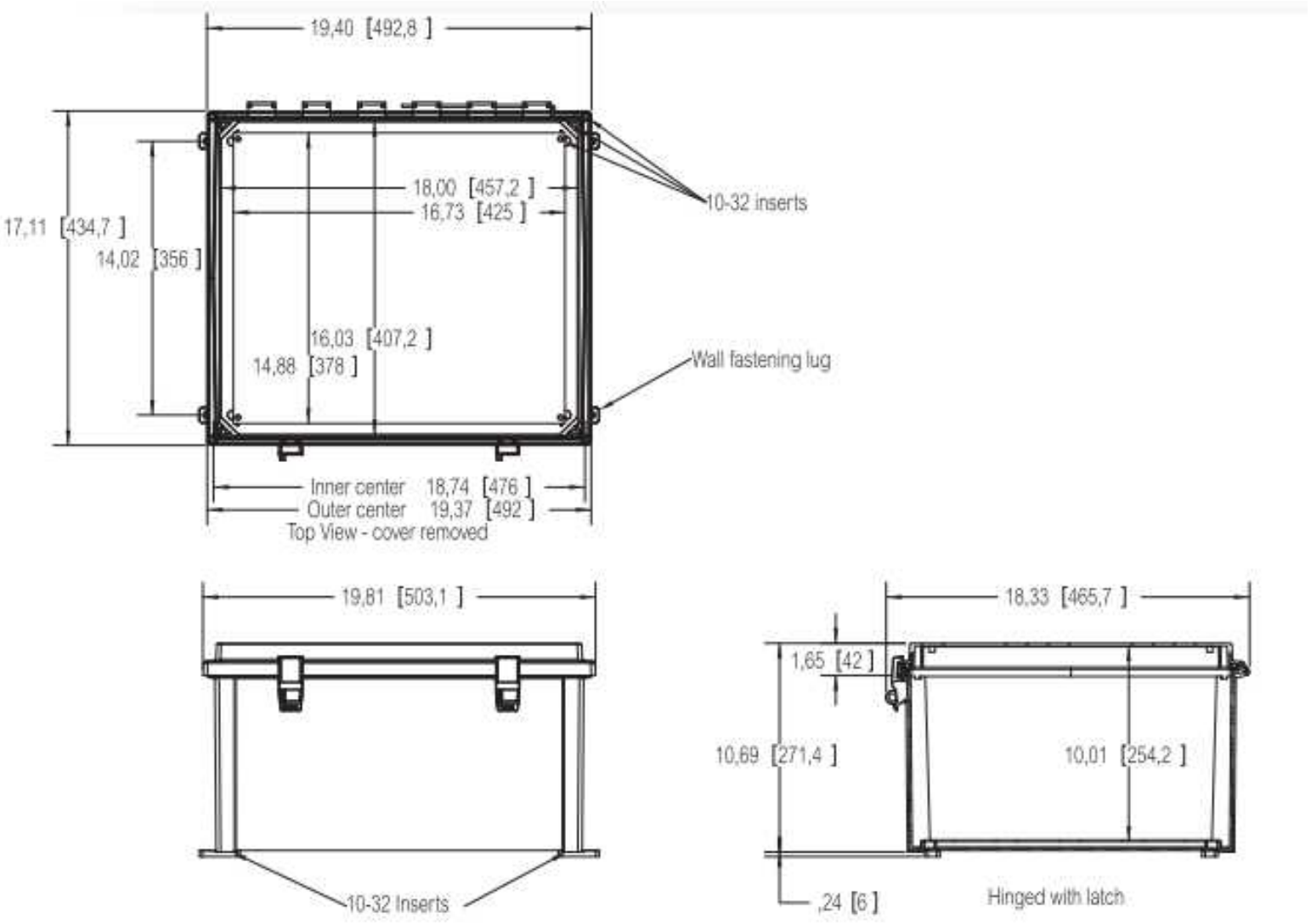
UV resistance: UL 508

Flammability Rating (UL 746 C 5): complies with UL 508

Glow Wire Test (IEC 695-2-1) °C: 960

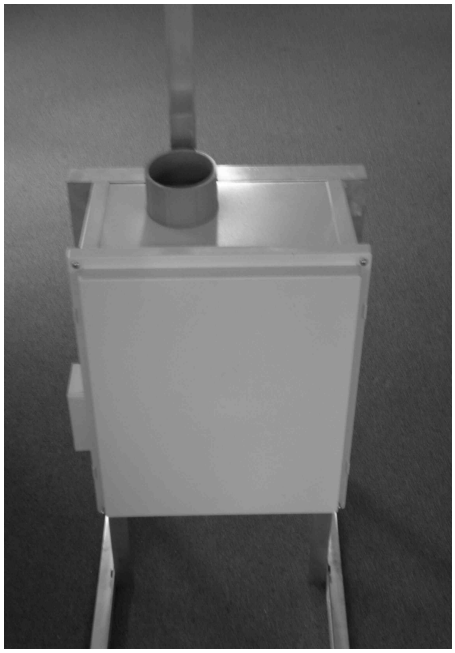
NEMA Class: UL Type 4, 4X, 6, 6P, 12 and 13

Certificates: Underwriters Laboratories



THE OBAR GBR76
COMPACT RADIAL BLOWER

Based on 25 years of experience and 2 years of research and development, the patent pending GBR series of compact radial blowers provide the perfect combination of performance and design.



GBR76 WITH ROOF MOUNT

PERFORMANCE

- GBR76 SOE 16” WC @ 0 Max flow 155 CFM.
- GBR76 UD 40” WC @ 0 Max flow 195 CFM.
- Built in speed control to customize performance.
- Condensate bypass built in.
- 12 month warranty 40,000 hr sealed bearings.

DESIGN

- Our modular design means the blower and manifold assembly can be removed and replaced as a unit. This makes repairs cost effective and easy and allows contractors to upgrade systems simply by swapping assemblies.
- The GBR series is based on a bypass blower designed to handle combustible materials.
- The housing is not required to be air tight so you can add gauges and alarms without compromising the system.
- Built in condensate bypass.
- Built in speed control.
- Quick disconnect electrical harness.
- All UL listed components including UL listed enclosure for outside use.
- Wall fastening lugs included.
- GBR series roof and wall mounts available to quickly configure the blowers for your installation while providing a custom built look.
- Compact design 16”x 14”x 8” weighing only 18 lbs.
- 3” schedule 40 inlet and exhaust.
- Universal Drive accepts voltage from 120-240V without alteration

GBR76 SOE	0”	2”	4”	6”	8”	10”	12”	16”	Wattage
SOE 16	150	140	129	118	105	90	75	35	150-320
SOE 12	125	115	100	83	62	39	0		110-200
SOE 8	105	90	70	42	0				60-120
SOE 4	75	50	0						37-50

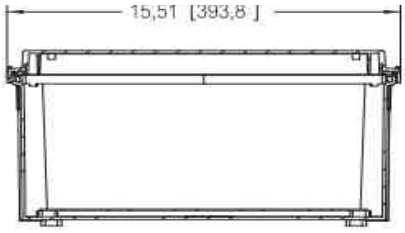
GBR SOE performance using built in potentiometer set at sealed vacuums of 16, 12, 8, and 4” WC

GBR76 UD	0”	10”	20”	30”	37”	Wattage
110V	195	158	118	63	20	700-870
220V	197	162	130	89	50	800-1100

Blower Specifications

Notes:

- **Input Voltage Range:** 108-132 Volts AC RMS, 50/60 Hz, single phase.
- **Input Current:** 6 amps AC RMS
- **Operating Temperature (Ambient Air and Working Air):** 0°C to 50°C
- **Storage Temperature:** -40°C to 85°C
- **Dielectric Testing:** 1500 Volts AC RMS 60 Hz applied for one second between input pins and ground, 3mA leakage maximum.
- **Speed Control Methods:** PWM (Pulse Width Modulation) (1 kHz to 10 kHz)
  0 to 10 VDC speed control.
  Mechanical: A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access for speed adjustment located in motor housing.
- **Approximate Weight:** 4.8 Lbs. / 2.2 Kg
- **Regulatory Agency Certification:** Underwriters Laboratories Inc. UL507 Recognized under File E94403 and compliant under the CE Low Voltage Directive 2006/95/EC.
- **Design Features:** Designed to provide variable airflow for low NOx & CO emission in high efficiency gas fired combustion systems. Built with non-sparking materials. Blower housing assembly constructed of die cast aluminum. Impeller constructed from hardened aluminum. Rubber isolation mounts built into blower construction to dampen vibration within the motor. Two piece blower housing assembly sealed with O-ring gasket for combustion applications. Customer is responsible to check for any leakage once the blower is installed into the final application.
- **Miscellaneous:** Blower inlet, discharge, and all motor cooling inlet and discharge vents must not be obstructed. Motor ventilation air to be free of oils and other foreign particles, (i.e. breathing quality air). Blower is to be mounted so ventilation air cannot be re-circulated.
  POWER CONNECTION: Blower connector, AMP Universal MATE-N-LOK, part no. 1-350943-0.
  SPEED CONNECTION: Blower connector, Molex Mini-Fit Jr., part no. 39-30-3056.
  Mating harnesses available upon request.



Screw cover

Enclosure Specifications

Rating:

Ingress Protection (EN 60529): 66/67

Electrical insulation: Totally insulated

Halogen free (DIN/VDE 0472, Part 815): yes

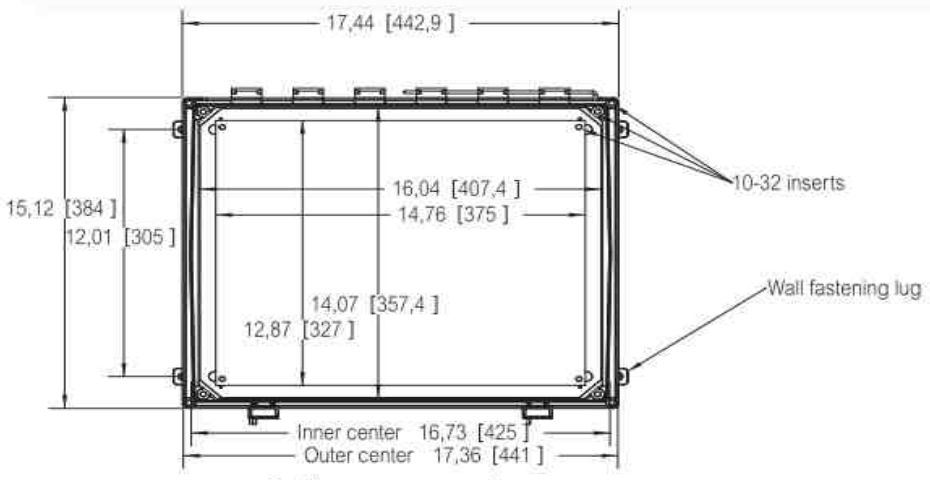
UV resistance: UL 508

Flammability Rating (UL 746 C 5): complies with UL 508

Glow Wire Test (IEC 695-2-1) °C: 960

NEMA Class: UL Type 4, 4X, 6, 6P, 12 and 13

Certificates: Underwriters Laboratories



Top View - cover removed

Appendix D

Health and Safety Plan (HASP)

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 system installation will be conducted within the Sloop Brewery area. A soil vapor intrusion assessment will be conducted within Building 338.
Specific Tasks Performed by GZA:	GZA will oversee drilling operations and will collect sub-slab and indoor air samples. GZA will oversee piping and blower installations. GZA will also conduct system conformance testing following installation.
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. Sub -contractor will conduct drilling operations through the slab, including SVE wells installed just below the slab and vapor monitoring point installations.
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.
General Drilling Operation/Heavy Equipment	Be aware of drill rig and equipment in your work area, keep in contact with any person(s) operating or supervising drilling equipment, stay a safe distance from drill rig while it is in motion. Stay out of operator's blind spots.
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 ~~a~~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.
Overhead Hazards	Prior to setting up drill rig at sample location, check for overhead utilities and/or obstructions that may interfere with equipment. Adjust sample location accordingly. Lower rig mast before moving locations. Maintain 10' clearance in all directions from overhead lines.
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 when working near the operating drill rig.

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.

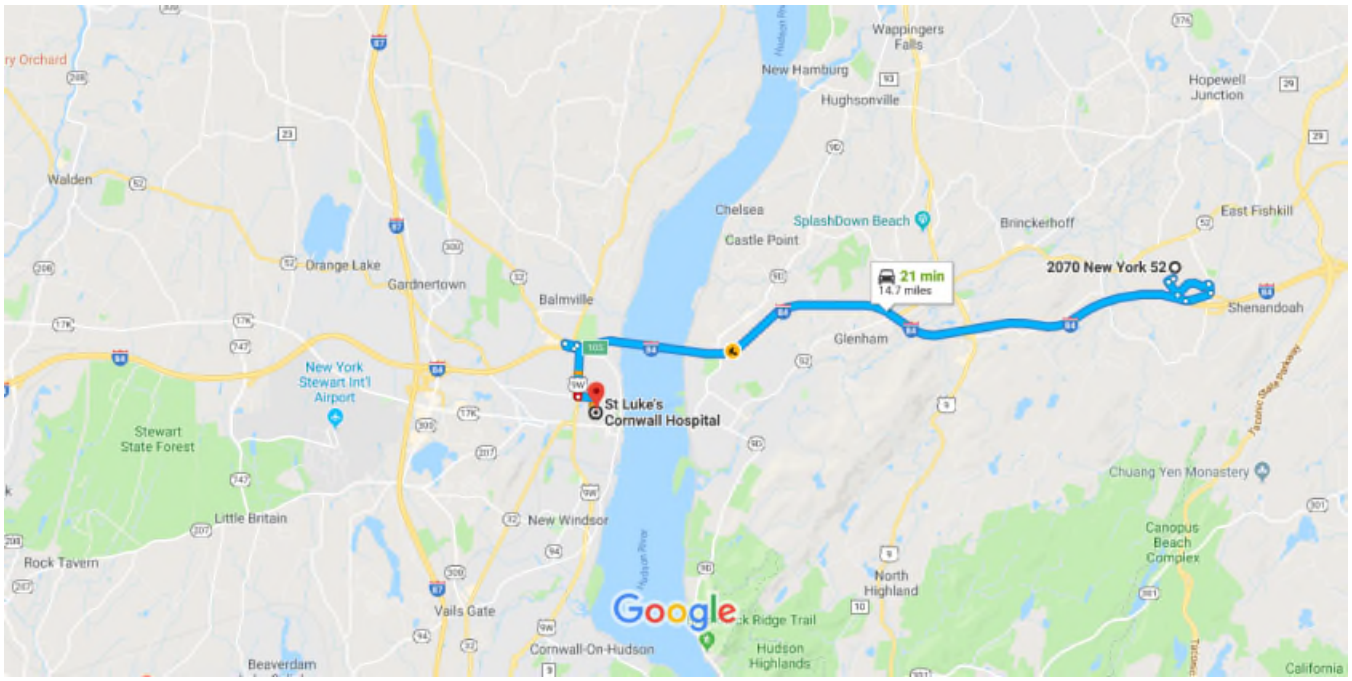
GZA Employee Name	GZA Employee Signature	Date

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		**4/8/19**
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.

GZA GeoEnvironmental, Inc.