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SITE INVESTIGATION WORKPLAN

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

NYSDEC Site No. 314054
EPA ID No. NYD000707901

March 6, 2019
File No. 12.0076252.10

PREPARED FOR:
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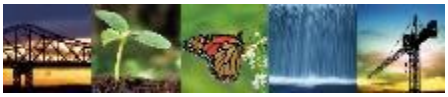

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March 6, 2019
File No. 12.0076252.10

Jessica LaClair
Environmental Engineer
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
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Re: Site Investigation Workplan – Sloop Brewery/Building 338
Former IBM East Fishkill Facility, Hopewell Junction, NY
NYSDEC Site No. 314054, EPA ID NYD000707901

Dear Ms. LaClair,

GZA GeoEnvironmental, Inc. (GZA) has prepared this Site Investigation Work Plan (SIWP) for the Sloop Brewery/Building 338 areas of the Former IBM East Fishkill facility in Hopewell Junction, NY (Site). The Site is currently owned by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park). i.park is proposing a change of use from industrial to commercial for the Site, as defined for this work plan. The entire Former IBM East Fishkill facility is currently zoned for industrial use under the RCRA Part 373 Permit entered into by 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. This Site Investigation Work Plan will provide sufficient data to characterize existing Site conditions for evaluating the proposed change of use.

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

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Meredith Hayes
Senior Project Manager

Mindy Sayers, P.G.
Consultant/Reviewer

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

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE INFORMATION 1

3.0 ENVIRONMENTAL SETTING 2

3.1 SOIL AND BEDROCK CONDITIONS 2

3.2 GROUNDWATER CONDITIONS 2

4.0 PREVIOUS INVESTIGATIONS 3

4.1 HISTORICAL DATA EVALUATION 3

4.2 SWMU EVALUATION 3

4.3 INDOOR AIR QUALITY EVALUATION 3

5.0 FIELD INVESTIGATION ACTIVITIES 4

5.1 SITE RECONNAISSANCE AND CAP EVALUATION 4

5.2 SOIL BORINGS 5

5.3 SOIL SAMPLE COLLECTION AND LABORATORY ANALYSIS 5

6.0 INVESTIGATION SUPPORT ACTIVITIES 6

6.1 UTLITY CLEARANCE 6

6.2 HEALTH AND SAFETY 6

6.3 COMMUNITY AIR MONITORING PLAN (CAMP) 6

6.4 EQUIPMENT DECONTAMINATION 6

6.4.1 Non-Dedicated Reusable Equipment 6

6.4.2 Disposal Sampling Equipment 6

6.4.3 Heavy Equipment 7

6.5 STORAGE AND DISPOSAL OF INVESTIGATIVE DERIVED WASTE 7

6.6 DATA VALIDATION 7

7.0 REPORTING 7

8.0 SCHEDULE 8

TABLE OF CONTENTS

9.0 REFERENCES 8

TABLES

TABLE 1 BUILDING NUMBER CONVERSIONS LIST
TABLE 2 SAMPLE LOCATIONS AND ANALYSES

FIGURES

FIGURE 1 SITE LOCATION PLAN
FIGURE 2 SITE MAP
FIGURE 3 SAMPLE LOCATION MAP

APPENDICES

APPENDIX A PHOTOGRAPH LOG
APPENDIX B SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN (QAPP)
APPENDIX C HEALTH AND SAFETY PLAN (HASP)
APPENDIX D COMMUNITY AIR MONITORING PLAN (CAMP)

1.0 INTRODUCTION

This Site Investigation Work Plan (SIWP) was prepared by GZA GeoEnvironmental, Inc. (GZA) on behalf of i.park84, LLC for submittal to the New York State Department of Environmental Conservation (NYSDEC). The subject of this SIWP is the Sloop Brewery/Building 338 areas of the Former IBM East Fishkill facility located at 2070 Route 52, Hopewell Junction, NY (herein referred to as the Site). **Figure 1** depicts the location of the Former IBM East Fishkill facility (herein referred to as the Facility). The Site is currently owned by i.park East Fishkill, LLC/i.park East Fishkill I, LLC (i.park). i.park is proposing a change of use from industrial to commercial for the Site area defined for this work plan. The entire Former IBM East Fishkill facility is currently zoned for industrial use under the 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. The objective of the site investigation is to collect sufficient data to characterize soils in these areas to evaluate the proposed change of use from industrial to commercial. IBM maintains responsibility for addressing groundwater and for addressing inaccessible solid waste management units (SWMUs) at the Facility. IBM also maintains responsibility for addressing soil 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 portion of Building 330C and Building 338. The on-Site groundwater is currently being treated by IBM via pump and treat processes, with production wells located throughout the Facility. IBM has conducted soil vapor and indoor air quality assessments throughout the Facility, including in Building 338 and the Sloop Brewery portion of Building 330C, which are included as part of the Site.

This SIWP was prepared by GZA, in general accordance with the NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10), dated May 2010. This SIWP is based on our current understanding of Site conditions and may need to be altered as additional information becomes available.

2.0 SITE 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 Site 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 and i.park. At the time of the sale, the Facility was divided into lots 1-8, with lots 1 and 5 sold to Global, and the remaining lots (2-4, 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. Building number conversions are identified in **Table 1**. All references to building numbers in this work plan reflect the historical building numbers; however, the conversion table is provided for on-Site reference, as the exteriors of the Facility buildings have been updated with the new building numbers. **Figure 2** depicts the Sloop Brewery and Building 338 areas and individual lot boundaries.

Volatile organic compounds (VOCs) 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 are areas where solvents have been released to the subsurface, and include:

- Area A – Located in the northeast portion of the Site and underlies all or parts of Buildings 303, 308, 309, 310, 316, 384, 385 and 386.
- Area B – Located proximate to Gate 4 on the east side of the Site and comprises the former fire brigade training area #1 and leach field.
- Area C – Building 330 and the former landfill to the east.
- Area D – Located in the northwest portion of the Site.
- Area E – Building 322 area.
- SEQ – The southeast portion of the Site between Area B and the former landfill area.
- Deep bedrock aquifer – groundwater underlying the Site.

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 Site 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. Since the final corrective measures address groundwater only, remedial goals were not established for soils; however, as stated in the Final Statement of Basis (NYSDEC 2013), soil removals were performed as part of the interim corrective measures and soils were removed until "contamination could not be detected." The Final Statement of Basis also indicates Facility-wide soil vapor and indoor air investigation by IBM is on-going and its conclusions and recommendations will be detailed in a future decision document. In addition, inaccessible SWMUs remain at the Facility. When they become accessible, IBM is to submit a RCRA Facility Investigation (RFI) Work Plan.

The August 2017 Interim Site Management Plan (SMP; GSC 2013) details the approved cover system for the Facility, which is comprised of 36 in. of soil that meets the industrial use soil cleanup objectives (SCOs), asphalt pavement, concrete-covered side-walks, and/or concrete building slabs. Based on our discussion with IBM, the existing cover system (existing soils, asphalt, concrete, and buildings) was determined by NYSDEC to be sufficient and soils or other materials were not placed to meet the cover system requirements.

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

4.0 PREVIOUS INVESTIGATIONS

4.1 HISTORICAL DATA EVALUATION

GZA performed a review of available historical environmental soil data for the Sloop Brewery and Building 338 areas. The existing environmental data is limited and was not incorporated into this work plan for one or more of the following reasons:

- The samples were collected at depths greater than three feet bgs and are therefore not representative of the cover system.
- The samples were collected for waste characterization purposes and data was only provided for a select list of analytes.
- The samples were collected at locations underneath a concrete building slab.

4.2 SWMU EVALUATION

GZA performed a review of Table II-1 of the 6 NYCRR Part 373 Permit, and an updated SWMU list provided by i.park (Arcadis 2015), which includes a list of SMWUs across the Site and their associated status. Based on the review of Table II-2 and conversations with i.park, SMWUs within the Sloop Brewery and Building 338 areas have been closed in accordance NYSDEC requirements or require no further action. GZA also reviewed Table II-2 of the Part 373 Permit, which includes a list of inaccessible SWMUs at the Facility. GZA determined that no inaccessible SWMUs listed in Table II-2 are located within the Sloop Brewery or Building 338 areas.

4.3 INDOOR AIR QUALITY EVALUATION

GZA reviewed the indoor air quality testing results for Building 338 collected in November 2018 by IBM. As part of the assessment, IBM collected only indoor air samples. Results indicated levels of carbon tetrachloride and Freon-12 above indoor air background values. However, carbon tetrachloride was detected at similar concentrations in ambient air, and Freon-12 concentrations were below background levels for outdoor air. Therefore, there are no immediate concerns in Building 338 with regards to indoor air quality. GZA will prepare a work plan for the collection of sub-slab soil gas samples across the building. The sub-slab soil gas results will be evaluated and further actions will be discussed with IBM and NYSDEC. A design for an SSDS or other appropriate mitigation method will be prepared following these discussions.

GZA reviewed the indoor air quality testing results for the Sloop Brewery area in Building 330C collected in November 2018 by Walden Environmental Engineering (Walden). As part of the assessment, Walden, on behalf of i.park, collected both indoor air and sub-slab vapor samples. The results, documented in a January 2019 report (Walden 2019), indicate elevated VOC concentrations in the sub-slab vapor and indoor air, most notably tetrachloroethylene (PCE) and trichloroethylene (TCE). Carbon tetrachloride was also detected in indoor air at concentrations exceeding background values. However, concentrations of carbon tetrachloride in the sub-slab samples were lower than indoor air concentrations, indicating a potential indoor air source of carbon tetrachloride rather than the sub-slab soil gas. The NYSDEC reviewed the January 2019 report and requested the installation of a sub-slab depressurization system (SSDS) beneath the slab of the Sloop Brewery in a letter to Walden dated February 1, 2019. GZA will prepare a work plan with a conceptual design for the SSDS system for review by NYSDEC. Upon review and acceptance, GZA, on behalf of i.park, will design and install an active SSDS in the Sloop Brewery area of Building 330C. This SSDS will be separate from the current SSDS system in Building 330C, which is operated by IBM and does not extend beneath the Sloop Brewery area.

5.0 FIELD INVESTIGATION ACTIVITIES

This SIWP has been designed to address only the top three feet of soils within the Sloop Brewery and Building 338 areas as part of the cover system at the Site. The Interim SMP defines the soil cover system as comprised of a minimum of 36 in. of soil that meets the Part 375 SCOs for industrial use, asphalt pavement, concrete-covered sidewalks, and concrete building slabs (GSC 2017). Due to the proposed change of use of the Site from industrial to commercial, the top 36 in. of soil will need to meet Part 375 SCOs for commercial use instead of industrial use as defined in the Interim SMP. A large portion of the surface cover in the Sloop/Building 338 areas consist of concrete building slabs and asphalt parking lots, with the remaining area consisting of landscaped areas. Based on conversations with i.park, there are no current plans for redevelopment of these areas, and the building footprints are planned to remain the same. Therefore, the SIWP has been designed to characterize the top three feet of soils in exposed landscaped areas. The concrete and asphalt covered surfaces meet the requirements of the cap for the proposed change of use, will remain in place, and will not be disturbed during redevelopment. However, this SIWP will include an evaluation of the current status of the cap on-Site to identify any maintenance that may be necessary. This SIWP does not involve a groundwater investigation as IBM maintains responsibility for the Facility groundwater as described in the RCRA 373 permit. This proposed scope of work does not negate IBM's current obligations to address groundwater, soil vapor and indoor air, and remaining inaccessible SWMUs at the Facility.

5.1 SITE RECONNAISSANCE AND CAP EVALUATION

GZA staff Meredith Hayes and David Winslow conducted a Site reconnaissance on February 8, 2019 to identify areas of exposed soils and any potential areas exhibiting evidence of environmental concerns. During the Site reconnaissance, GZA observed the majority of the Sloop Brewing and Building 338 areas to be covered with either asphalt or concrete building slabs. GZA also observed small sections of landscaped areas (exposed soils) across the Sloop Brewery and Building 338 areas. Photographs depicting Site conditions during GZA's reconnaissance are presented in **Appendix A**. As part of implementation of this work plan, GZA personnel will observe the cover system (i.e., asphalt cover) within the Site area to identify if any improvements to the cover system are necessary in order to comply with the Interim SMP. GZA will recommend repair of cracks as necessary to prevent direct contact with sub-surface soils.

5.2 SOIL BORINGS

The proposed subsurface investigation will consist of 17 exploratory soil borings. The soil borings will be designated SB-1 through SB-17. Based on the observations during the Site reconnaissance, boring locations were biased to provide sufficient coverage of landscaped areas, where soils are exposed and not covered by concrete/asphalt cap. Areas covered by asphalt/concrete will not be sampled, as discussed above. Proposed exploration locations are shown on **Figure 3**. Boring locations may be adjusted in the field to avoid any identified utilities, existing monitoring wells, or other Site features. If additional exposed soils are identified during investigation activities, additional borings will be installed, and additional samples will be collected. If visual evidence of contamination is identified during the completion of borings, GZA and i.park will discuss potential additional sampling below three feet with the NYSDEC. The presence of on-Site utilities will be evaluated prior to mobilization. Existing monitoring well locations were provided by IBM, borings will not be conducted within close proximity to avoid damaging the wells.

All borings will be advanced to three feet bgs to characterize the upper three feet of soils. GZA's chosen subcontractor will provide the necessary equipment to retrieve soil cores through landscaped surfaces using direct push drilling techniques. A GZA scientist/engineer will be present to observe the subsurface explorations, classify soil cores and prepare soil boring logs. Descriptive information concerning soil from each sampling location will be recorded in a field notebook and classified using a modified Unified Soil Classification System (USCS). Soil cores will be logged based on appearance, texture, moisture content and odor. The boring log will also include the sample designation, sample collection date and depth, total depth of the boring, depth and apparent thickness of identified layers of impacted soil, and recovery percentages. Olfactory and visual evidence of impacted soils will also be noted on the boring log. Soil cores will be screened for volatile organic compounds (VOCs) using a photoionization detector (PID), the results of which will be presented on the boring log.

5.3 SOIL SAMPLE COLLECTION AND LABORATORY ANALYSIS

Analytical soil samples will be collected from soil cores at the discrete depth intervals outlined in **Table 2** and as described below.

A total of five soil samples will be collected from each of the soil cores, according to the following:

- 0-2 in.: Semi-volatile organic compounds (SVOCs), metals, pesticides, herbicides and polychlorinated biphenyls (PCBs)
- 2-6 in.: VOCs
- 6-12, 12-24, and 24-36 in.: VOCs, SVOCs, metals, pesticides, herbicides, and PCBs

The samples will be placed directly from the sampling equipment into laboratory-supplied containers. Completed sample labels will be affixed to the side of the container and the top of the jar will be labeled with the job name, boring number, sample number and depth collected. Once the sample containers are filled, they will be placed in a cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4˚C.

Duplicate samples will be collected at a rate of five percent (5%) (one duplicate for every 20 samples), one equipment blank will be collected per day, and one trip blank per sample shipment. Matrix-spike and matrix-spike duplicate (MS/MSD) samples will also be collected at a rate of five percent (5%) (one MS/MSD for every 20 samples). **Appendix B** presents the Site-Specific Quality Assurance Project Plan (QAPP). Soil samples will be shipped via courier to a New York State

Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory under proper chain-of-custody procedures for analysis.

6.0 INVESTIGATION SUPPORT ACTIVITIES

6.1 UTLITY CLEARANCE

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

6.2 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 sampling activities, provided as **Appendix C**.

6.3 COMMUNITY AIR MONITORING PLAN (CAMP)

Ground intrusive work (including soil borings) will be conducted in accordance with the Site-specific CAMP provided in **Appendix D**.

6.4 EQUIPMENT DECONTAMINATION

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated and/or managed according to the procedures outlined below. Refer to the QAPP in **Appendix B** for a more detailed description of equipment decontamination procedures.

6.4.1 Non-Dedicated Reusable Equipment

Non-dedicated reusable equipment such as stainless-steel mixing bowls and spoons will require field decontamination. Acids and solvents will not be used in the field decontamination of such equipment. Decontamination typically involves scrubbing/washing with a laboratory grade detergent (e.g., alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used for this purpose from any treated municipal water system. Well water will not be used for this purpose. Equipment will be allowed to dry, or wiped dry with clean paper towels, prior to additional use. Steam cleaning or high pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

6.4.2 Disposal Sampling Equipment

Disposable sampling equipment includes disposable gloves and polyethylene sampling spatulas. Disposable sampling equipment will be used only once.

6.4.3 Heavy Equipment

Certain heavy equipment such as drilling steel will be subject to high pressure hot water or steam cleaning. A member of the sampling team will visually inspect the equipment to check that visible contamination has been removed by the procedures listed above prior to sampling and between drilling locations. The drilling casing and down-hole equipment will be cleaned prior to arrival on Site and between soil borings.

6.5 STORAGE AND DISPOSAL OF INVESTIGATIVE DERIVED WASTE

Disposable sampling supplies will be bagged/containerized and properly disposed of as solid waste. Should residual soil cuttings be generated, they will be drummed, properly labeled, and staged on-site pending waste characterization analysis and transportation to the appropriate off-site disposal facility. Refer to the QAPP in **Appendix B** for further storage and disposal procedures.

6.6 DATA VALIDATION

A Data Usability Summary Report (DUSR) will be prepared in accordance with the DER-10. The data usability evaluation will include reviewing the quality assurance/quality control (QA/QC) information including: (1) chain-of-custody; (2) the summary QA/QC information provided by the laboratory; and (3) the project narrative. Refer to the QAPP in **Appendix B** for a more detailed description of DUSR preparation procedures.

7.0 REPORTING

GZA will provide daily field reports (DFR) during all investigation activities. Upon completion of the field activities, a Site Investigation Report (SIR) will be prepared to document the findings of the investigations performed at the Site and propose corrective measures where needed. The report will be consistent with the specifications presented in DER-10 and will include:

- An executive summary
- Description of field activities performed
- A summary of pertinent field observations and field measurements
- Laboratory data summarized in tabular format and compared to NYSDEC commercial SCOs
- A DUSR for the laboratory data collected during the investigation
- Conclusions and recommendations.

Data collected during the SI will be submitted in the Department's Environmental Information Management System (EIMS) format for electronic data delivery (EDD).

8.0 SCHEDULE

A schedule for implementation of the work described in this work plan is provided below. The schedule will be initiated upon NYSDEC approval of this work plan. Updates to the schedule based on a change in Site conditions, subcontractor availability, or other factors will be communicated to NYSDEC.

Mobilization to Site	One week following NYSDEC approval of this work plan
Field activities	One week
Laboratory analysis	Two weeks
Prepare SIR, validate data, and submit SIR to NYSDEC	Two weeks

9.0 REFERENCES

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.

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.

Walden Environmental Engineering (Walden), 2019. Soil Vapor Intrusion Investigation Summary Report, Sloop Brewery Co. Building 330C.

Arcadis, 2015. SWMU Closure Report – IBM/Global Foundries, East Fishkill, New York.

Groundwater Sciences Corporation (GSC), 2017. Interim Site Management Plan – Hudson Valley Research Park (Former IBM East Fishkill Facility), 2070 Route 52, Hopewell Junction, New York 12533.

Tables

TABLE 1

BUILDING CONVERSIONS LIST

Sloop Brewery/Building 338 Area SIWP

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
SAMPLE LOCATIONS AND ANALYSES
Sloop Brewery/Building 338 Area SIWP
2070 Route 52
Hopewell Junction, New York 12533

Boring ID	Coordinates[1]		Sample Interval (inches bgs)	Analytical Parameters[2]					
	X - Easting	Y - Northing		VOCs (Method 8260)	SVOCs (Method 8270)	Pesticides (Method 8081B)	Herbicides (Method 8151A)	PCBs (Method 8082A)	TAL Metals (Method 6010)
SB-1	678669.2866	986128.0693	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-2	678754.51	986238.074	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-3	678827.1833	986234.1028	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-4	678624.3571	985142.6951	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-5	678717.8965	985211.2591	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-6	678800.2437	985259.9807	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-7	678666.1157	985036.5407	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-8	678840.3211	985051.8314	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X

TABLE 2
SAMPLE LOCATIONS AND ANALYSES
Sloop Brewery/Building 338 Area SIWP
2070 Route 52
Hopewell Junction, New York 12533

Boring ID	Coordinates[1]		Sample Interval (inches bgs)	Analytical Parameters[2]					
	X - Easting	Y - Northing		VOCs (Method 8260)	SVOCs (Method 8270)	Pesticides (Method 8081B)	Herbicides (Method 8151A)	PCBs (Method 8082A)	TAL Metals (Method 6010)
SB-9	678940.5813	985057.2152	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-10	679034.8368	985085.3172	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-11	678982.2548	985256.5862	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-12	678901.7161	985379.7867	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-13	678855.7453	985454.5624	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-14	678819.8991	985584.8488	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-15	678655.792	986240.491	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
SB-16	678806.381	986341.221	0 - 2		X	X	X	X	X
			2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X
			0 - 2		X	X	X	X	X

TABLE 2

SAMPLE LOCATIONS AND ANALYSES

Sloop Brewery/Building 338 Area SIWP

2070 Route 52

Hopewell Junction, New York 12533

Boring ID	Coordinates[1]		Sample Interval (inches bgs)	Analytical Parameters[2]					
	X - Easting	Y - Northing		VOCs (Method 8260)	SVOCs (Method 8270)	Pesticides (Method 8081B)	Herbicides (Method 8151A)	PCBs (Method 8082A)	TAL Metals (Method 6010)
SB-17	678691.487	986351.197	2 - 6	X					
			6 - 12	X	X	X	X	X	X
			12 - 24	X	X	X	X	X	X
			24 - 36	X	X	X	X	X	X

Notes:

1. All coordinates in NAD83 New York State Planes, East Zone, US Foot

2. All analytical groups will be analyzed for full NYCRR Part 375-6.8 list parameters.

Acronyms:

bgs = below ground surface

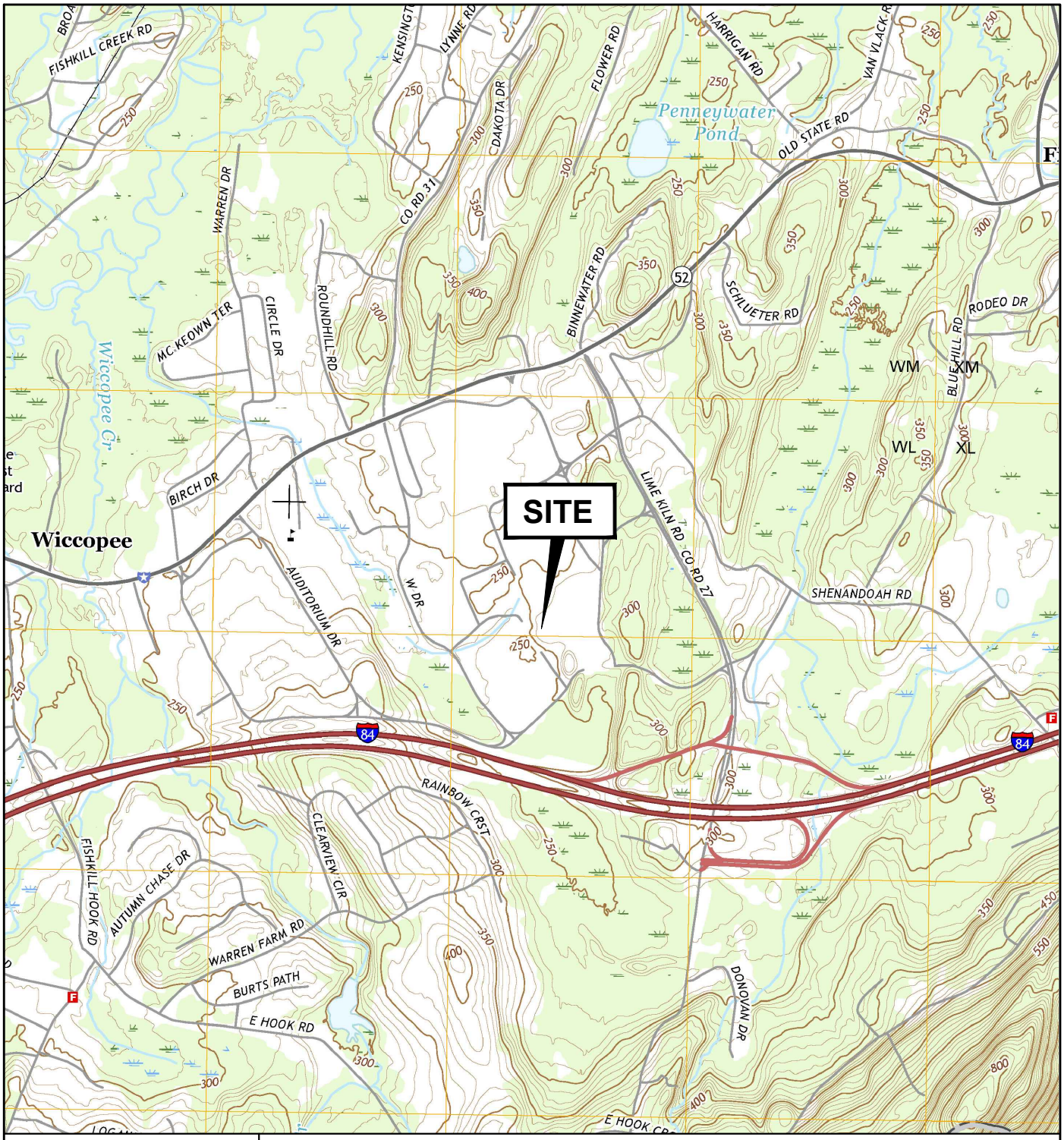
PCBs = polychlorinated biphenyls

SVOCs = semi-volatile organic compounds

TAL = target analyte list

VOC = volatile organic compounds

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

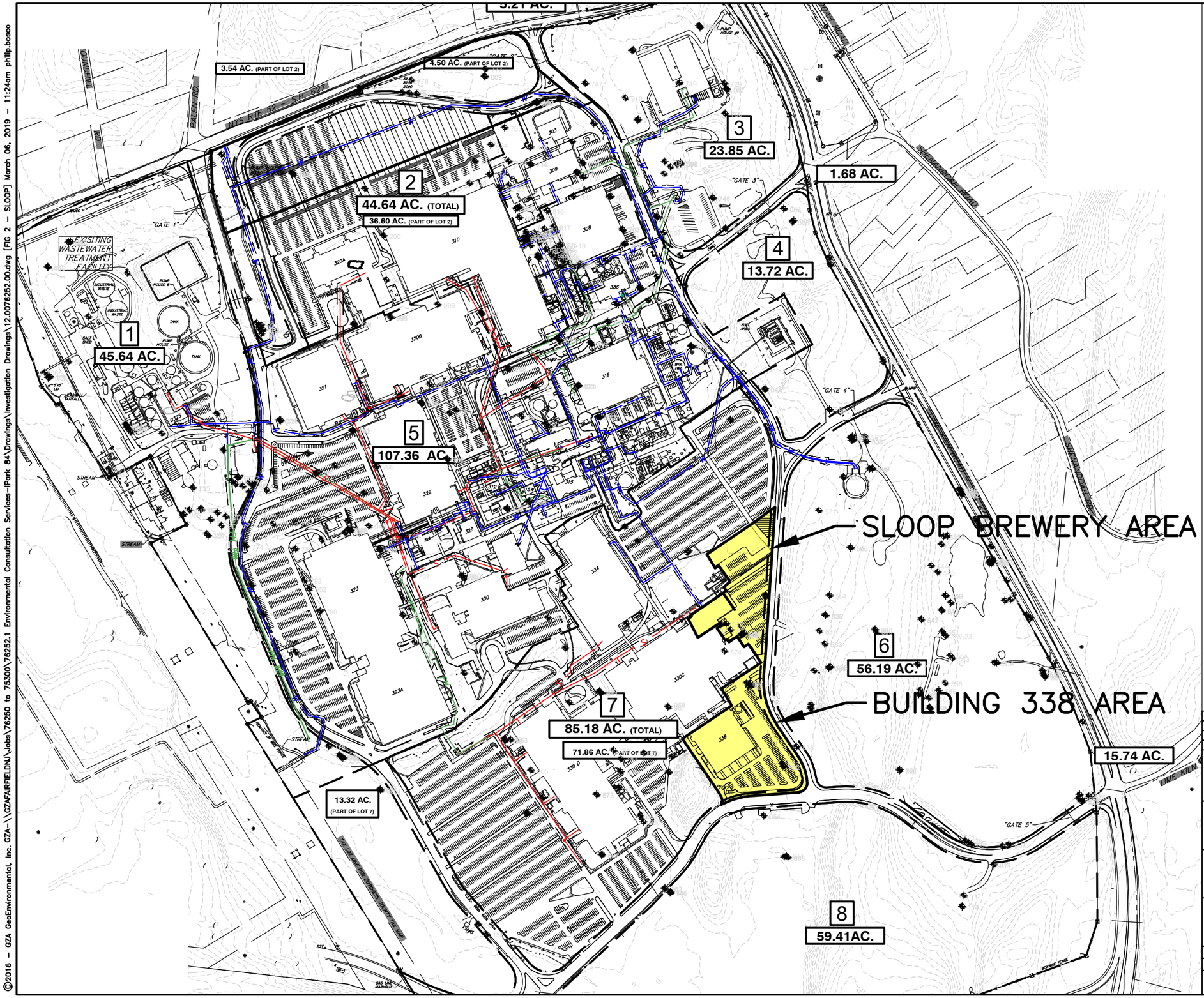
SLOOP BREWERY/BUILDING 338 AREA

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: BR	FIGURE 1
DESIGNED BY: BR	DRAWN BY: MT	SCALE: 1" = 2,000'	
DATE: FEBRUARY 2019	PROJECT NO. 12.0076252.00	REVISION NO.	SHEET NO.



N

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

1
45.64 AC. — LOT IDENTIFICATION AND ACREAGE

LOT BOUNDARIES

UTILITY EASEMENT BOUNDARY

WATER UTILITY LINE

UNKNOWN UTILITY LINE

SANITARY SEWER LINE

MW-337 — MONITORING WELL

0 250 500 1,000
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

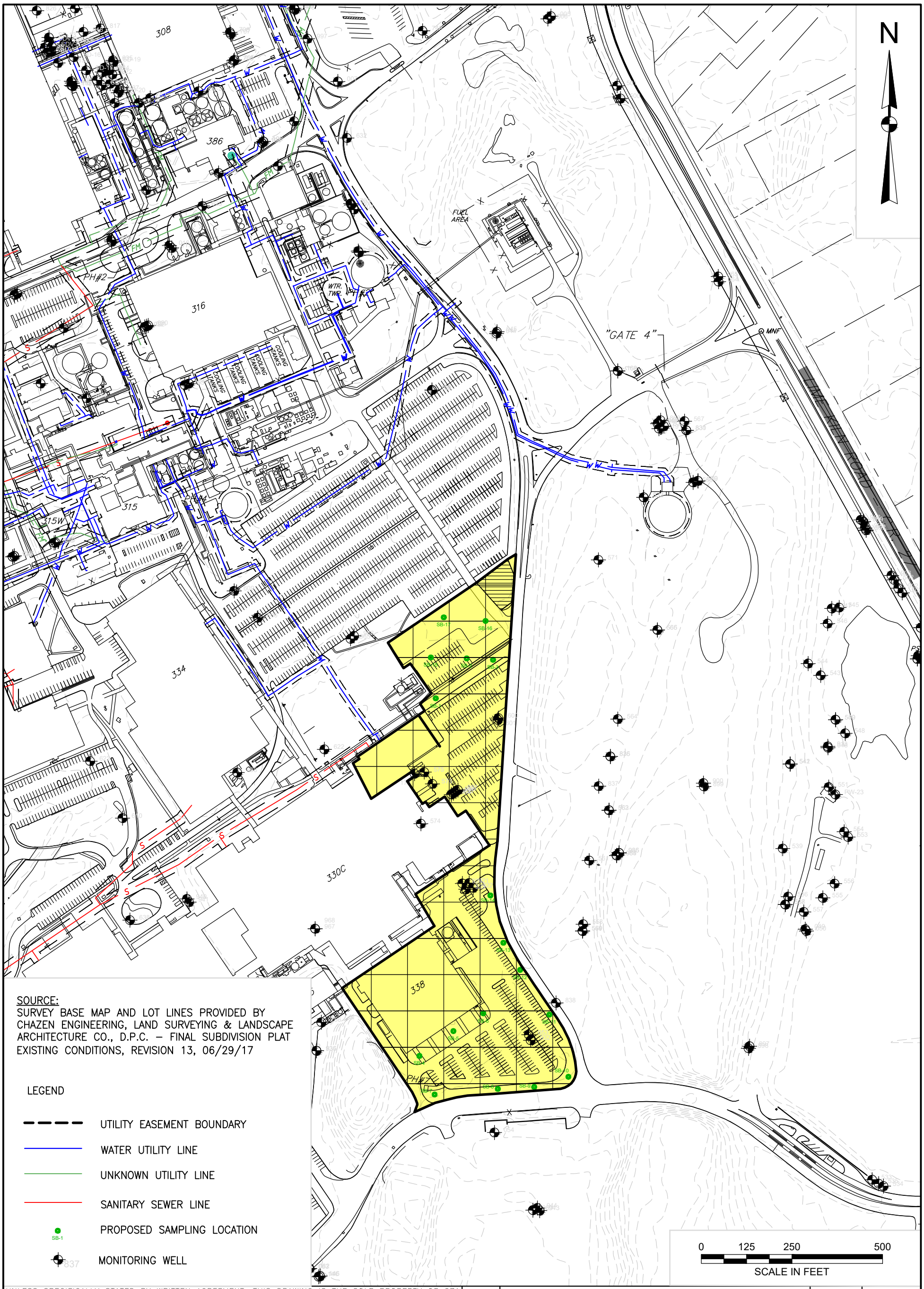
SLOOP BREWERY/BUILDING 338 AREA SITE INVESTIGATION WORKPLAN

SITE PLAN

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

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

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



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

LEGEND

- UTILITY EASEMENT BOUNDARY
- WATER UTILITY LINE
- UNKNOWN UTILITY LINE
- SANITARY SEWER LINE
- SB-1 PROPOSED SAMPLING LOCATION
- MONITORING WELL

NO.	ISSUE/DESCRIPTION	BY	DATE

SLOOP BREWERY/BUILDING 338 AREA
SITE INVESTIGATION WORKPLAN

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

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

PROPOSED SAMPLE LOCATION MAP

PROJ MGR:	MH	REVIEWED BY:	DW	CHECKED BY:	BR
DESIGNED BY:	BR	DRAWN BY:	PB	SCALE:	1" = 250'
DATE:	FEBRUARY, 2019	PROJECT NO.	12.0076252.10	REVISION NO.	

FIGURE
3
SHEET NO. 1 OF 1

Appendix A

Photographic Log

Client Name: i.park84, LLC	**Site Location:** Sloop Brewery/Building 338	**Project No.** 12.0076252.10

Photo No.	**Date:**
1	2/8/2019

Direction Photo Taken:
West

Description:
Sloop Brewery entrance.

Photo No.	**Date:**
2	2/8/2019

Direction Photo Taken:
Northwest

Description:
Building 330C asphalt-covered parking lot.

Photographic Log

Client Name: i.park84, LLC	**Site Location:** Sloop Brewery/Building 338	**Project No.** 12.0076252.10

Photo No.	**Date:**
3	2/8/2019

Direction Photo Taken:
West

Description:
Building 330C loading dock area.

Photo No.	**Date:**
4	2/8/2019

Direction Photo Taken:
South

Description:
Building 330C asphalt covered parking lot.

Photographic Log

Client Name: i.park84, LLC	**Site Location:** Sloop Brewery/Building 338	**Project No.** 12.0076252.10

Photo No.	**Date:**
5	2/8/2019

Direction Photo Taken:
West

Description:
Landscaped area south of Building 338.

Photo No.	**Date:**
6	2/8/2019

Direction Photo Taken:
East

Description:
Building 338 asphalt-covered parking lot.

Photographic Log

Client Name: i.park84, LLC	**Site Location:** Sloop Brewery/Building 338	**Project No.** 12.0076252.10

Photo No.	**Date:**
7	2/8/2019

Direction Photo Taken:
East

Description:
Landscaped area east of Building 338.

Photo No.	**Date:**
8	2/8/2019

Direction Photo Taken:
Northeast

Description:
Landscaped area northeast of Building 338.

Photographic Log

Client Name: i.park84, LLC	**Site Location:** Sloop Brewery/Building 338	**Project No.** 12.0076252.10

Photo No.	**Date:**
9	2/8/2019

Direction Photo Taken:
North

Description:
Building 338 and associated asphalt-covered parking lot.

Appendix B

Known for excellence.
Built on trust.

Quality Assurance/Quality Control Plan (QAPP)

Sloop Brewery/Building 338
Former IBM East Fishkill Facility
2070 Route 52
Hopewell Junction, NY
NYSDEC Site No. 314054
EPA ID No. NYD000707901

February 20, 2019
File No. 12.0076252.10

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

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

31 Offices Nationwide
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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY 1

3.0 QA OBJECTIVES FOR DATA MANAGEMENT 1

4.0 SAMPLING PLAN 4

4.1 GRAB/COMPOSITE SAMPLING 4

4.2 SOIL SAMPLING (DIRECT PUSH DRILLING) 4

4.3 WASTE CHARACTERIZATION SAMPLING 5

4.3.1 Solid Waste 5

4.3.2 Grab vs. Composite Sampling 5

4.4 QUALITY CONTROL SAMPLE COLLECTION 5

4.5 SAMPLE PRESERVATION AND CONTAINERIZATION 6

4.6 EQUIPMENT DECONTAMINATION 6

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY 7

5.1 SAMPLE COLLECTION DOCUMENTATION 7

5.1.1 Field Notes 7

5.1.2 Chain-of-Custody Records 8

5.1.3 Sample Labeling 8

5.2 SAMPLE CUSTODY 10

5.2.1 Field Custody Procedures 10

5.2.2 Laboratory Custody Procedures 11

6.0 CALIBRATION PROCEDURES 12

6.1 FIELD INSTRUMENTS 12

6.2 LABORATORY INSTRUMENTS 12

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES 12

8.0 DATA REDUCTION, VALIDATION, AND REPORTING 12

TABLE OF CONTENTS

8.1 DATA EVALUATION/VALIDATION 13

8.1.1 Field Data Evaluation 13

8.1.2 Data Usability 13

8.2 IDENTIFICATION AND TREATMENT OF OUTLIERS 13

9.0 INTERNAL QUALITY CONTROL 14

10.0 CORRECTIVE ACTION 14

10.1 IMMEDIATE CORRECTIVE ACTION 15

TABLES

TABLE 1 SOIL CRITERIA TABLE

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

TABLE 3 TYPICAL LABORATORY DATA QUALITY OBJECTIVES

TABLE 4 QC SAMPLE PRESERVATION AND CONTAINER REQUIREMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the Site Investigation Work Plan at the Sloop Brewery/Building 338 area of the Former IBM East Fishkill Facility in Hopewell Junction, New York (Site).

This QAPP describes specific protocols for field sampling, sample handling and storage, chain-of-custody, laboratory analysis, and data handling and management. Preparation of this QAPP is based on U.S. Environmental Protection Agency (EPA) Quality Assurance Project Plan guidance documents, including:

- EPA Requirements for Quality Assurance Project Plans (EPA March 2001)
- Guidance for Quality Assurance Project Plans (EPA December 2002).

The data generated from the analysis of samples will be used to characterize Site conditions, and results will be compared to NYCRR Part 375-6.8(b) restricted use Soil Cleanup Objectives (SCOs) for commercial use. A list of the potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), is shown in **Table 1**.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

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

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

Laboratories used will be New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratories. The laboratories will communicate directly with the sampler regarding the analytical results and reporting and will be responsible for providing all labels, sample containers, field blank water, trip blanks, shipping coolers, and laboratory documentation.

3.0 QA OBJECTIVES FOR DATA MANAGEMENT

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

All analytical measurements will be made so that the results are representative of the media sampled and the conditions measured. Data will be reported in consistent dry weight units for solid samples (i.e., µg/kg and/or mg/kg), µg/L or mg/L for aqueous samples. **Table 2** presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers.

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

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

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

Tables 3 and 4 present the precision and accuracy requirements for each parameter to be analyzed. For quantitation limits for parameters associated with soil, sediment, and solid waste samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in 6 NYCRR Part 375.

For quantitation limits for parameters associated with groundwater samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits for groundwater from the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values. In certain instances, if the TOGS criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limit.

The QA objectives are defined as follows:

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

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

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

This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. **Tables 3 and 4** summarize the laboratory accuracy requirements.

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

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

  Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic soil, sediment and water analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be assessed through the analysis of matrix duplicates and field duplicates. For soil gas analyses, laboratory precision will be assessed through the analysis of matrix duplicates. MS/MSD samples or matrix duplicates will be performed at a frequency of one per twenty investigative samples per matrix per parameter. **Tables 3 and 4** summarize the laboratory precision requirements.

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

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

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

- ***Representativeness*** is a qualitative parameter that expresses the degree to which data accurately and precisely represent either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

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

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

- ***Comparability*** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

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

4.0 SAMPLING PLAN

Environmental sampling is expected to be limited to soil sampling. Additional wastes generated during remediation or development will be sampled and tested for characterization for disposal. Direct push drilling (GeoProbe®) and hollow-stem auger drilling will be the preferred methods for obtaining subsurface soil samples; however, other drilling methods including manual hand auguring may also be used if allowable by site conditions. Performing grab or composite sampling using appropriate hand-held sampling equipment will be the preferred method for waste characterization sampling.

4.1 GRAB/COMPOSITE SAMPLING

Grab soil/solid samples will be collected from the material or interval in question by retrieving a volume for analysis using a clean stainless steel, aluminum, or mild steel scoop, trowel, spoon, or bucket auger and placing the soil in a cleaned stainless-steel pan for homogenization before inserting into the sample container. Samples collected for analysis for volatile organic compounds and total organic halides will not be homogenized. Samples for volatile organics analysis and total organic halides will be placed directly into the sample container.

Composite samples will be collected in the same manner described above, except that the discrete sample volumes will be placed in a clean stainless-steel pan and mixed to form the composite. Composite sampling will be performed for the following objectives:

- Waste characterization
- Determination of the suitability of the soil for on-site re-use
- Evaluation of health and safety requirements for workers that will disturb the soil during subsequent construction work.

4.2 SOIL SAMPLING (DIRECT PUSH DRILLING)

Sampling will be performed using four-foot-long acetate sleeves that will be advanced continuously to the desired depth below the surface. Soil samples from each sleeve will be screened using a photoionization detector (PID), to detect possible organic vapors. Organic vapor screening will be performed by slicing open the acetate sleeve, making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the soil column at the field geologist's discretion.

The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.) Samples for laboratory analysis will be collected from the six-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field geologist's

judgment (field conditions may require a section longer than six inches to make sufficient sample; however, this decision will be field-based).

The samples will be collected by cutting the soil in two places with a decontaminated steel, stainless steel, or aluminum trowel, spoon, or knife and homogenized in a decontaminated stainless-steel pan before being placed in the sample bottles. Samples collected for analysis for volatile organic compounds (VOCs) and total organic halides will be placed directly into the sample containers without homogenization (as per EPA sampling method 5035A). Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Only clean metal instruments will be allowed to touch the sample. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or below this depth, if appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next depth interval.

Soil samples will be collected in laboratory provided containers and transported to a New York State Department of Health (NYSDOH) ELAP Certified laboratory, under proper chain of custody procedures for analysis. Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at below 4˚C.

4.3 WASTE CHARACTERIZATION SAMPLING

Waste classification sampling may be conducted to characterize soil and/or liquids for the purpose of proper off-site waste disposal. Specific methods for sampling liquid and solid wastes are briefly discussed below.

4.3.1 Solid Waste

Solid sampling methods include utilizing dedicated stainless steel or Teflon® scoops/shovels, triers, and thiefs. Scoops and shovels are the preferred method for sampling solids from piles or containers. Stainless steel triers are similar to a scoop and are used for the collection of a core sample of a solid material. Thiefs are long hollow tubes, with an inner tube, and are used for sampling of dry free running solids (e.g., pile of fine sand). To sample solid material at varying depths, a hollow stem auger or a core sampler in conjunction with an auger can be utilized (see Soil Sampling Section).

4.3.2 Grab vs. Composite Sampling

Waste characterization of a liquid or a solid can involve grab or composite sampling depending upon the homogeneity and the volume of the waste. Grab sampling consists of collecting a discrete sample or samples of a material and submitting each sample for separate analysis. Grab sampling is appropriate for characterizing small quantities of waste as well as waste streams of varying content (e.g., drums of different contents). Composite sampling consists of taking discrete grab samples of a material and combining them into a smaller number of samples for analysis. Composite sampling generally is appropriate for large volumes of a homogenous waste material, such as a pile of soil or construction debris. The specific number of composite and grab samples largely will depend upon the size and nature of the waste pile (i.e., cubic yards) as well as the analysis required for characterization of the waste.

4.4 QUALITY CONTROL SAMPLE COLLECTION

QC samples will include equipment blanks, trip blanks and field duplicates.

Equipment blanks will consist of distilled water and will be used to check for potential contamination of the equipment that may cause sample contamination. Equipment blanks will be collected by routing the distilled water through the

sampling equipment prior to sample collection. Equipment blanks will be submitted to the laboratory at a frequency of one per day per matrix per type of equipment being used per parameter. Equipment blanks will not be collected with samples for analysis for TCLP parameters, parameters associated with wastewater samples, samples collected for disposal purposes, soil gas samples, chip samples, wipe samples and samples collected for grain size analyses.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for volatile organic compound contamination of groundwater samples due to contaminant migration during sample shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains groundwater samples for analysis for VOCs.

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters with the exception of TCLP parameters, parameters associated with wastewater samples, samples collected for waste characterization purposes, chip samples, wipe samples and samples collected for grain size analyses.

4.5 SAMPLE PRESERVATION AND CONTAINERIZATION

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

Table 4 presents a summary of QC sample preservation and container requirements.

4.6 EQUIPMENT DECONTAMINATION

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

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

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

Groundwater sampling pumps will be cleaned by washing and scrubbing with an Alconox/water mixture, rinsing with tap water and irrigating with distilled/deionized water.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1 SAMPLE COLLECTION DOCUMENTATION

5.1.1 Field Notes

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

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

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

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

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

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

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

Field logbooks will be reviewed on a daily basis by the field team leader. Logbooks will be supported by standardized forms.

5.1.2 Chain-of-Custody Records

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

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

5.1.3 Sample Labeling

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

A. The following identification scheme will be used:

Soil borings will be assigned sequential numbers. For soil samples collected from soil borings, sample numbers will be assigned as follows:

SB-# (sampling interval)

Example:

Sample SB-4(5-6') = soil sample collected from soil boring #4 at a depth of 5-6' below grade.

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

Blanks should be spelled out and identify the associated matrix, e.g. Equipment Blank, Soil

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

   Example: SVOC

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

   Example: 03-22-12

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

   Example: 14:30

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

F. Other information relevant to the sample.

   Example: Equipment Blank

An example sample label is presented below:

Job No: XXXXXXXXX
Client: Name
Sample No: B22(5-5.5')
Matrix: Soil
Date Taken: 3/22/12
Time Taken: 14:30
Sampler: B. Smith
Analysis: SVOC

Job No._____
Client:_____
Sample Number_____
Date_____ Sample Time _____

Sample Matrix_____
Grab or Composite (explain)_____
Preservatives_____
Analyses_____
Sampler Signature_____

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

5.2 SAMPLE CUSTODY

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

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

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

5.2.1 Field Custody Procedures

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

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.
- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in **Section 5.1.3** of this Plan.
- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.
- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

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

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

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

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

5.2.2 Laboratory Custody Procedures

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

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

- Examine all sample containers for damage,

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

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

- Verify that sample holding times have not been exceeded,

- Examine all shipping records for accuracy and completeness,

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

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

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

- Attach laboratory sample container labels with unique laboratory identification and test, and

- Place the samples in the proper laboratory storage.

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

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

6.0 CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

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

6.2 LABORATORY INSTRUMENTS

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

7.0 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

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

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

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

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

8.1 DATA EVALUATION/VALIDATION

8.1.1 Field Data Evaluation

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

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

8.1.2 Data Usability

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

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

For each data package the following questions will be evaluated:

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

8.2 IDENTIFICATION AND TREATMENT OF OUTLIERS

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

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

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier.

Further statistical analysis may be performed with and without the outlier to determine its effect on the conclusions. In many cases, two data sets may be reported, one including, and one excluding the outlier.

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

9.0 INTERNAL QUALITY CONTROL

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

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

Field quality control samples will include:

- Equipment blanks as outlined in **Table 4**
- Field duplicate samples as outlined in **Table 4**
- Trip blanks as outlined in **Table 4**

10.0 CORRECTIVE ACTION

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

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

10.1 IMMEDIATE CORRECTIVE ACTION

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

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

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

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

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

The analyst may identify the need for corrective action. The laboratory section leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The laboratory QA manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be

achieved, the QEP will be notified. The QEP will notify the program manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

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

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

Tables

TABLE 1

SOIL CRITERIA TABLE

Sloop Brewery/Building 338 Area

2070 Route 52

Hopewell Junction, New York 12533

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Metals							
Arsenic	13 [m]	16 [f]	17 [f]	18 [f]	19 [f]	13 [f]	16 [f]
Barium	350 [m]	350 [f]	400	400	10,000 [d]	433	820
Beryllium	7.2	14	72	590	2,700	10	47
Cadmium	2.5 [m]	2.5 [f]	4.3	9.3	60	4	7.5
Chromium, hexavalent [h]	1 [l]	22	110	400	800	1 [e]	19
Chromium, trivalent[h]	30 [m]	36	180	1,500	6,800	41	NS
Copper	50	270	270	270	10,000 [d]	50	1,720
Total Cyanide [h]	27	27	27	27	10,000 [d]	NS	40
Lead	63 [m]	400	400	1,000	3,900	63 [f]	450
Manganese	1600 [m]	2,000 [f]	2,000 [f]	10,000 [d]	10,000 [d]	1600 [f]	2,000 [f]
Total Mercury	0.18 [m]	0.81 [j]	0.81 [j]	2.8 [j]	5.7 [j]	0.18 [f]	0.73
Nickel	30	140	310	310	10,000 [d]	30	130
Selenium	3.9 [m]	36	180	1,500	6,800	3.9 [f]	4 [f]
Silver	2	36	180	1,500	6,800	2	8.3
Zinc	109 [m]	2200	10,000 [d]	10,000 [d]	10,000 [d]	109 [f]	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	3.8	58	100 [a]	500 [b]	1,000 [c]	NS	3.8
4,4'-DDE	0.0033 [l]	1.8	8.9	62	120	0.0033 [e]	17
4,4'-DDT	0.0033 [l]	1.7	7.9	47	94	0.0033 [e]	136
4,4'-DDD	0.0033 [l]	2.6	13	92	180	0.0033 [e]	14
Aldrin	0.005 [m]	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	0.02	0.097	0.48	3.4	6.8	0.04 [g]	0.02
beta-BHC	0.036	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	0.094	0.91	4.2	24	47	1.3	2.9
delta-BHC	0.04	100 [a]	100 [a]	500 [b]	1,000 [c]	0.04 [g]	0.25
Dibenzofuran	7	14	59	350	1,000 [c]	NS	210
Dieldrin	0.005 [m]	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	102
Endosulfan II	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	102
Endosulfan sulfate	2.4	4.8 [i]	24 [i]	200 [i]	920 [i]	NS	1,000 [c]
Endrin	0.014	2.2	11	89	410	0.014	0.06
Heptachlor	0.042	0.42	2.1	15	29	0.14	0.38
Lindane	0.1	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	0.1	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	20	100 [a]	100 [a]	500 [b]	1,000 [c]	20	98
Acenapthylene	100 [k]	100 [a]	100 [a]	501 [b]	1,000 [c]	NS	107
Anthracene	100 [k]	100 [a]	100 [a]	502 [b]	1,000 [c]	NS	1,000 [c]
Benz(a)anthracene	1 [m]	1 [f]	1 [f]	5.6	11	NS	1 [f]
Benzo(a)pyrene	1 [m]	1 [f]	1 [f]	1 [f]	1.1	2.6	22
Benzo(b)fluoranthene	1 [m]	1 [f]	1 [f]	5.6	11	NS	1.7
Benzo(g,h,i)perylene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Benzo(k)fluoranthene	0.8 [m]	1	3.9	56	110	NS	1.7
Chrysene	1 [m]	1 [f]	3.9	56	110	NS	1 [f]
Dibenz(a,h)anthracene	0.33 [l]	0.33 [e]	0.33 [e]	0.56	1.1	NS	1,000 [c]
Fluoranthene	100 [k]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Fluorene	30	100 [a]	100 [a]	500 [b]	1,000 [c]	30	386
Indeno(1,2,3-cd)pyrene	0.5 [m]	0.5 [f]	0.5 [f]	5.6	11	NS	8.2
m-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Naphthalene	12	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	12
o-Cresol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
p-Cresol	0.33 [l]	34	100 [a]	500 [b]	1,000 [c]	NS	0.33 [e]
Pentachlorophenol	0.8 [l]	2.4	6.7	6.7	55	0.8 [e]	0.8 [e]
Phenanthrene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]
Phenol	0.33 [l]	100 [a]	100 [a]	500 [b]	1,000 [c]	30	0.33 [e]
Pyrene	100	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1,000 [c]

TABLE 1

SOIL CRITERIA TABLE

Sloop Brewery/Building 338 Area

2070 Route 52

Hopewell Junction, New York 12533

Contaminant	Protection of Public Health					Protection of Ecological Resources[n]	Protection of Groundwater
	Unrestricted Use	Residential	Restricted-Residential	Commercial	Industrial		
All soil cleanup objectives (SCOs) are in parts per million (ppm); approximately equivalent to mg/kg.							
Volatiles							
1,1,1-Trichloroethane	0.68	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.68
1,1-Dichloroethane	0.27	19	26	240	480	NS	0.27
1,1-Dichloroethene	0.33	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.33
1,2-Dichlorobenzene	1.1	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	1.1
1,2-Dichloroethane	0.02 [m]	2.3	3.1	30	60	10	0.02 [f]
cis-1,2-Dichloroethene	0.25	59	100 [a]	500 [b]	1,000 [c]	NS	0.25
trans-1,2-Dichloroethene	0.19	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	0.19
1,3-Dichlorobenzene	2.4	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	1.8	9.8	13	130	250	20	1.8
1,4-Dioxane	0.1 [l]	9.8	13	130	250	0.1 [e]	0.1 [e]
Acetone	0.05	100[a]	100[b]	500 [b]	1,000 [c]	2.2	0.05
Benzene	0.06	2.9	4.8	44	89	70	0.06
Butylbenzene	12	100[a]	100[a]	500 [b]	1,000 [c]	NS	12
Carbon tetrachloride	0.76	1.4	2.4	22	44	NS	0.76
Chlorobenzene	1.1	100[a]	100[a]	500 [b]	1,000 [c]	40	1.1
Chloroform	0.37	10	49	350	700	12	0.37
Ethylbenzene	1	30	41	390	780	NS	1
Hexachlorobenzene	0.33 [l]	0.33[e]	1.2	6	12	NS	3.2
Methyl ethyl ketone	0.12	100 [a]	100 [a]	500 [b]	1,000 [c]	100 [a]	0.12
Methyl tert-butyl ether	0.93	62	100 [a]	500 [b]	1,000 [c]	NS	0.93
Methylene chloride	0.05	51	100 [a]	500 [b]	1,000 [c]	12	0.05
n-Propylbenzene	3.9	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	3.9
sec-Butylbenzene	11	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	11
tert-Butylbenzene	5.9	100 [a]	100 [a]	500 [b]	1,000 [c]	NS	5.9
Tetrachloroethene	1.3	5.5	19	150	300	2	1.3
Toluene	0.7	100 [a]	100 [a]	500 [b]	1,000 [c]	36	0.7
Trichloroethene	0.47	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	3.6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	8.4	47	52	190	380	NS	8.4
Vinyl chloride	0.02	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	0.26	100 [a]	100 [a]	500 [b]	1,000 [c]	0.26	1.6

Notes:

[a] The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm.

[b] The SCOs for commercial use were capped at a maximum value of 500 ppm.

[c] The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm.

[d] The SCOs for metals were capped at a maximum value of 10,000 ppm.

[e] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

[f] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

[g] This SCO is derived from data on mixed isomers of BHC.

[h] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

[i] This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

[j] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts).

[k] The SCOs for unrestricted use were capped at a maximum value of 100 ppm.

[l] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

[m] For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

[n] Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

Acronyms:

PCB = polychorinated biphenyls

TABLE 2

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

Sloop Brewery/Building 338 Area

2070 Route 52

Hopewell Junction, New York 12533

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Soil	VOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil	PCBs	Grab	TBD	SW-846 Method 8082A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Pesticides (TCL)	Grab	TBD	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	PAHs or SVOCs (STARS or TCL)	Grab	TBD	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Metals (TAL)	Grab	TBD	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Soil	Cyanide	Grab	TBD	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil	Herbicides	Grab	TBD	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Organophosphorous Pesticides	Grab	TBD	SW-846 Method 8141A[6]	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar

Notes:

[1] For soil samples, a six-inch sampling interval is the preferred sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.

[2] Actual number of samples may vary depending on field conditions, sample material availability, and field observations. See Remedial Work Plan for estimates.

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

[4] I-Chem Series 300 bottles

[5] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices

[6] Accutest utilizes SW-846 Method 8270C for organophosphorous pesticides and Lancaster utilizes SW-846 Method 8141A.

Acronyms:

TBD = To Be Determined

TABLE 3

TYPICAL LABORATORY DATA QUALITY OBJECTIVES FOR SOIL SAMPLES

2070 ROUTE 52

HOPEWELL JUNCTION, NEW YORK 12533

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs (TCL or STARS)	SW-846 Method 8260B	Soil	Surrogates % Rec. 1,2-Dichloroethane-d4 61-133 4-Bromofluorobenzene 65-142 Dibromofluoromethane 70-120 Toluene-d8 75-123 Matrix Spikes	Surrogates: All samples, standards, QC samples Matrix Spikes:	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 per soils MS/MSDs:
			1,1-Dichloroethene 47-136 Trichloroethene 42-145 Benzene 49-134 Toluene 41-143 Chlorobenzene 42-142	One per 20 per matrix type	1,1-Dichloroethene 20 Trichloroethene 19 Benzene 17 Toluene 19 Chlorobenzene 20	One per 20 per matrix type
PCBs	SW-846	Soil	Surrogates % Rec. Decachlorobiphenyl 40-151 Tetrachloro-m-xylene 37-140 Matrix Spikes	Surrogates: All samples, standards, QC samples Matrix Spikes:	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 per soils MS/MSDs:
			Aroclor 1016 43-161 Aroclor 1020 37-164	One per 20 per matrix type	Aroclor 1016 19 Aroclor 1020 24	One per 20 per matrix type
PAHs (CP-51)	SW-846 Method 8270C	Soil	Surrogates % Rec. Nitrobenzene-d5 26-113 2-Fluorobiphenyl 40-106 Terphenyl-d14 35-142 Matrix Spikes	Surrogates: All samples, standards, QC samples Matrix Spikes:	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 MS/MSDs:
			Naphthalene 24-115 2-Methylnaphthalene 25-120 Acenaphthylene 31-105 Acenaphthene 31-118 Fluorene 35-123 Fluoranthene 28-130 Pyrene 18-149 Phenanthrene 31-128 Anthracene 31-129 Benzo(a)anthracene 31-129 Chrysene 27-134 Benzo(b)fluoranthene 21-151 Benzo(k)fluoranthene 29-142 Benzo(a)pyrene 26-133 Indeno(1,2,3-cd)pyrene 12-134 Dibenzo(a,h)anthracene 18-125 Benzo(g,h,i)perylene 0-132	One per 20 per matrix type	Naphthalene 25 2-Methylnaphthalene 23 Acenaphthylene 22 Acenaphthene 25 Fluorene 25 Fluoranthene 39 Pyrene 42 Phenanthrene 39 Anthracene 32 Benzo(a)anthracene 33 Chrysene 32 Benzo(b)fluoranthene 33 Benzo(k)fluoranthene 37 Benzo(a)pyrene 33 Indeno(1,2,3-cd)pyrene 34 Dibenzo(a,h)anthracene 31 Benzo(g,h,i)perylene 35	One per 20 per matrix type
SVOCs (TCLP or CP-51) and Organophosphorous Pesticides	SW-846 Method 8270C	Soil	Surrogates % Rec. Phenol-d5 34-110 2-Fluorophenol 33-105 2,4,6-Tribromophenol 33-124 Nitrobenzene-d5 26-113 2-Fluorobiphenyl 40-106 Terphenyl-d14 35-142 Matrix Spikes	Surrogates: All samples, standards, QC samples Matrix Spikes:	Field Duplicates RPD <50 MS/MSDs (RPD)	Field Duplicates: One per 20 per soils MS/MSDs:
			Phenol 40-109 2-Chlorophenol 43-107 4-Chloro-3-methylphenol 42-104 Acenaphthene 31-118 4-Nitrophenol 14-138 Pentachlorophenol 22-125 Pyrene 18-149	One per 20 per matrix type	Phenol 18 2-Chlorophenol 16 4-Chloro-3-methylphenol 19 Acenaphthene 25 4-Nitrophenol 34 Pentachlorophenol 21 Pyrene 42	One per 20 per matrix type

TABLE 3
TYPICAL LABORATORY DATA QUALITY OBJECTIVES FOR SOIL SAMPLES
2070 ROUTE 52
HOPEWELL JUNCTION, NEW YORK 12533

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Pesticides (TCL)	SW-846 Method 8081A	Soil	Surrogates % Rec. Decachlorobiphenyl 28-148 Tetrachloro-m-xylene 31-136 Matrix Spikes Gamma-BHC 35-148 Heptachlor 51-136 Aldrin 49-137 Dieldrin 51-151 Endrin 27-168 4,4'-DDT 20-193	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix	Field Duplicates RPD <50 MS/MSDs (RPD) Gamma-BHC 29 Heptachlor 32 Aldrin 29 Dieldrin 28 Endrin 30 4,4'-DDT 42	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Total Petroleum Hydrocarbons	SW-846 Method 8015B	Soil	Surrogates % Rec. o-Terphenyl 27-153 Tetracosane-d50 28-148 5α-androstane 27-148 TPH-DRO 10-149	Surrogates: All samples, standards, QC samples One per 20 per matrix type	Field Duplicates RPD <50 TPH-DRO 44	Field Duplicates: One per 20 per soils One per 20 per matrix type
Herbicides	SW-846 Method 8151A	Soil	Surrogates % Rec. 2,4-DCAA 10-147 Matrix Spikes 2,4-D 10-130 2,4,5-TP 19-108 2,4,5-T 10-121	Surrogates: All samples, standards, QC samples Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD V50 MS/MSDs (RPD) 2,4-D 53 2,4,5-TP 59 2,4,5-T 62	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Metals (TAL)	SW-846 Methods 6010B/7000 Series	Soil	Surrogates % Rec. Matrix Spikes 75-125% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD <20	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Cyanide	SW-846 Method 9012A	Soil	Surrogates % Rec. Matrix Spikes 85-120% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD <10	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type
Total Organic Halides	SW-846 Method 9023	Soil	Surrogates % Rec. Matrix Spikes 69-132% recovery	Surrogates: Matrix Spikes: One per 20 per matrix type	Field Duplicates RPD <50 MS/MSDs (RPD) RPD <16	Field Duplicates: One per 20 per soils MS/MSDs: One per 20 per matrix type

TABLE 3

TYPICAL LABORATORY DATA QUALITY OBJECTIVES FOR SOIL SAMPLES

2070 ROUTE 52

HOPEWELL JUNCTION, NEW YORK 12533

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
Organophosphorous	SW-846 Method 8141A	Soil	Surrogates % Rec.	Surrogates:	Field Duplicates	Field Duplicates:
Pesticides			2-Nitro-m-xylene 67-134	All samples, standards, QC samples	RPD <50	One per 20 per soils
			Matrix Spikes	Matrix Spikes:	MS/MSDs (RPD)	MS/MSDs:
			Parathion 63-147	One per 20 per matrix type	RPD <35	One per 20 per matrix type

Notes:

1. Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.

2. Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Acronyms:

MS = matrix spike

MSD = matrix spike duplicate

QC = quality control

PAH = Polycyclic Aromatic Hydrocarbon

PCB = polychlorinated biphenyl

RPD = relative percent difference

TCLP = toxicity characteristic leaching procedure

VOC = volatile organic compound

TABLE 4

QC SAMPLE PRESERVATION AND CONTAINER REQUIREMENTS

Sloop Brewery/Building 338 Area

Hopewell Junction, New York 12533

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container[2]
Soil	VOCs (CP-51 or TCL)	Field Duplicate	1 per 20 samples	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Soil	PCBs	Field Duplicate	1 per 20 samples	SW-846 Method 8082A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Pesticides (TCL)	Field Duplicate	1 per 20 samples	SW-846 Method 8081A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Herbicides	Field Duplicate	1 per 20 samples	SW-846 Method 8151A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	PAHs or SVOCs (CP-51 or TCL)	Field Duplicate	1 per 20 samples	SW-846 Method 8270C	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar
Soil	Cyanide	Field Duplicate	1 per 20 samples	SW-846 Method 9012A	Cool to 4^0 C	14 days to analysis	(1) 300 mL amber glass jar
Soil	Metals (TAL)	Field Duplicate	1 per 20 samples	SW-846 Method 6010B/7000 Series	Cool to 4^0 C	28 days to analysis for Hg; 6 months to analysis for other metals	(1) 300 mL amber glass jar
Soil	Organophosphorous Pesticides	Field Duplicate	1 per 20 samples	SW-846 Method 8270C or 8141A	Cool to 4^0 C	14 days to extraction; 40 days from extraction to analysis	(1) 300 mL amber glass jar

Notes:

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

[2] I-Chem Series 300 bottles

[3] One (1) Field blank to be collected per day of sampling for all analytical criteria listed above.

Acronyms:

Appendix C

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

1. CLIENT/SITE/PROJECT INFORMATION		
Client: i.Park84, LLC		
Site Address: Sloop Brewery and 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 parking lots 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. Outdoor areas consist of asphalt parking lots and landscaped areas.		
Work Environment (active manufacturing, office, vacant site, undeveloped property, etc.): Work environment will consist entirely of outdoor work. Work will be conducted throughout the active-asphalt parking lot and within the landscaped areas adjacent to the parking lots and roadway.		
Job/Project #: 12.0076252.10	Estimated Start Date: 3/11/2019	Estimated Finish Date: 3/11/2020
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].	General drilling operation and soil sampling.
Specific Tasks Performed by GZA:	GZA staff will observe drilling operations, collect soil samples, screen soil samples with a PID, and log soil sample descriptions.
Concurrent Tasks to be Performed by GZA-hired Subcontractors (List Subcontractors by Name):	Sub-contractor will perform drilling operations including; soil borings, retrieval of soil samples.
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:				

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:
☐ 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	20.11 - Field Sampling, 21.10 General Outdoor Fieldwork, 4.1 – Drilling Observation and Soil 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.
Weather Related Hazards	Assess weather condition prior to onsite work and examine forecast for anticipated period of work. Dress appropriately for expected weather conditions.
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.
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 regularly

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.

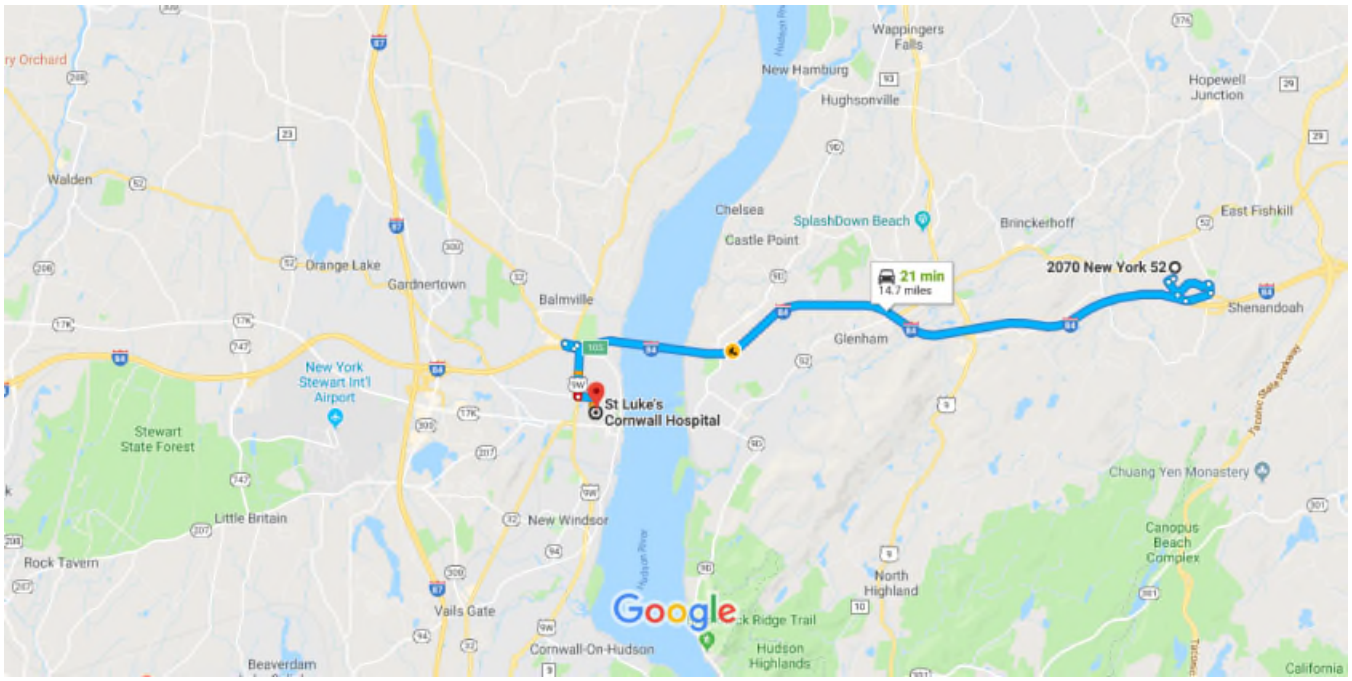
GZA Employee Name	GZA Employee Signature	Date

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		**02/07/19**
EHS Reviewer		**2/19/19**
Principal in Charge		**2/20/19**

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.

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
		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.

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
		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.
		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.

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
		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.
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: 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.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Pre-work preparation	Overlooking of potential hazards	Become familiar with project area and job site by reviewing available on-line mapping (USGS Topographic, NWI Wetland, NRCS Soil, etc.; and aerial photographs before visiting site. Understand related hazards through review of this and other Task Hazard Analyses and participate in daily safety tailgate meetings (where applicable).
		Communicate Task Hazard Analysis and Lessons Learned information to operator(s) prior to initiating work and throughout the project as needed.
Driving to site	Vehicle accidents/collisions/injuries	Perform pre-operation check of vehicle, verifying service brakes, parking brake, steering, lights, tires, horn, wipers mirrors and glass are in good condition. verify that the rig is roadworthy.
		Wear seat belts always when driving even on site.
		Secure loose materials in cab or bed of vehicle.
		Keep windshields, windows and lights cleans.
		Abide by safe driving procedures.
	Backing collisions	If possible avoid backing by using a route that allows you to pull through.
		If backing up from a parked area do a quality 360 walker.
Working within transportation corridors or active construction sites	Collisions injuries	Wear high visibility safety vest on site when out of personal or GZA vehicle.
		Park vehicle in designated parking locations, or select off-road area that is firm, and without 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 vehicle.
		Use emergency flashers or other appropriate vehicle warning system when parking outside of standard parking spaces, or to stop in right-of-
		Be alert at all times; never step outside traffic cones.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Stand clear of moving heavy equipment and away from any overhead utility lines until equipment is safely in position and parked properly and securely by the contractor.
		Do not wear headphones or earbuds, or listen to music or talk on the phone, which may distract from work hazards.
	Crossing Automobile traffic lanes	Wear high visibility safety vests at all times when out of vehicle and working within or adjacent to the roadway.
	Crossing Airport Movement Areas (e.g., Runways, taxiways, approaches)	Learn, know, and conform to project site Airport's, Airfield's, or Airbase's protocol for crossing movement areas (whether on foot or in vehicle).
		Work within airport movement areas or safety zones must be coordinated with the Air Traffic Control Tower.
		Vehicles to have blinking or flashing lights or beacons; pedestrians to wear high visibility safety vests.
		Using protocol, maintain communication with airport security and air traffic controllers.
	Crossing Railways	Work within active railroad ROWs requires railroad safety training. No work can be done within the railroad traffic envelope without the permission of a railroad flagman.
		No equipment or vehicles can cross without the permission of a railroad flagman.
		Expect any train on any track coming from either direction at any time.
Working in Natural or Remote Areas	Slips, trips, fall	Be aware of loose ground materials such as talus, unconsolidated rock, soil, sediment, ice and other media that could cause slips, trips or falls.
		Be careful when walking in heavily vegetated areas. Mind tangles of vines, thorny branches, and slippery logs and rock surfaces. Dense vegetation and especially entangled vines present trip hazards, or can mask voids, sharp objects, or other hazards beneath.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS		
GZA Job Tasks	**Potential Hazards**	**Controls**
		Be vigilant for signs of cracking, shifting, fracturing, and evidence of past movement.
		Use wood mats or other stabilizing materials for equipment if soft ground conditions are present.
		Use walking stick, auger, or ski poles to steady yourself when traversing loose material or slopes.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear proper footwear for conditions.
		Store tools in their proper storage location when not in use.
		Provide adequate lighting when necessary.
	Falls into excavations/ voids	Stand away from edges of excavations and voids. Do not attempt access without proper equipment / training. Remember that some excavations or voids may constitute a confined space and may present structural stability issues.
	Cave-ins and engulfment	DO NOT enter caves, sinkholes, excavations, and other voids or concavities that are not sloped or shored properly and have not been evaluated by a competent person to be safe.
		Stand away from edges of excavations, cliffs, dug wells, and other voids.
		Watch for cracks/fissures in the ground surface in the immediate vicinity of a pit or void, which indicate imminent sidewall failure/cave-in.
		Assess if confined space entry procedures need to be implemented.
		Before entering void (if required to do so and with proper training) be aware of any hazards at the surface (boulders, equipment) which may fall into the void.
Working among hazardous biota	Plant toxins Incidental contact	Know the appearance of poison ivy and poison sumac in all seasons, and if sensitive to these toxins, carry and use special cleaning soaps/solutions when thought to be exposed. Stock first aid kit with poison ivy/sumac cleaning soaps/solutions.
	Ticks	Ticks carry risk of Lyme's and other Diseases. Tick season is basically any field day above 40 degrees F.
		Tuck pants into long socks.
		The application of DEET (or permethrin pre-treatment) to clothing in season to control exposure to ticks is recommended.
		Check clothing for ticks frequently.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Check whole body immediately upon returning from field and shower.
	Mosquitoes	Be aware of intermittent seasonal reports of mosquito borne diseases, such as West Nile disease and Eastern Equine Encephalitis (EEE), and their locations relative to your field site. Use of DEET or other mosquito repellant is recommended.
	Stinging bees and wasps	Be aware of potential cavity, suspended or ground nesting bee/wasp/hornet nests. Avoid undue disturbance or approach with appropriate safety clothing, protection and netting.
		Take appropriate precautions if allergic to bees. Carry at least two epi-pens in first aid kit as well as anti-histamines (oral and inhalers).
		Avoid areas of heavy bee activity if allergic. Avoid perfumed soaps, shampoos, deodorants, colognes, etc. that may attract bees.
	Poisonous Snakes	Be aware of terrain likelihood of harboring poisonous snakes in your work zone. Avoid reaching or stepping into hidden areas (such as into wood pile, rock pile, debris pile, stone wall, etc.) without pre-inspection.
		Coordinate with local hospitals to verify they have proper anti-venom in stock.
		Learn first aid procedures in case of poisonous snake bite.
		Devise an action plan and include in the site-specific HASP.
	Wild Animals	Do NOT handle wildlife unless properly trained to do so.
		Beware of any wild animal that shows no sign of wariness of humans.
		Do NOT attempt to feed wild animals or to help apparently injured wild animals.
		Be aware of domestic animals that may also pose a threat such as dogs off leash, bulls out to pasture, etc.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
Working in Adverse Weather Conditions	Heat / cold stress and other weather related hazards	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). Include clothing and the presence / absence of shade when calculating a heat index.
		Schedule work day to avoid working during hottest or coldest parts of the day, to the extent practicable.
		Keep exposed skin covered in extremely cold weather.
		Recognize signs of frostbite; use warming packs and layer clothing to maintain warmth.
		Use a wicking layer of clothing against your body to keep moisture away from skin.
		Wool clothing will continue to keep you warm after it becomes wet; cotton will not.
		Use protective ointments such as sunscreen and chap stick, as appropriate to the field conditions.
		Stay hydrated in hot weather; drink fluids regularly throughout the day, even if not thirsty.
		Recognize signs of heat stress; take frequent breaks in shade when working in direct sunlight for prolonged periods.
		Be familiar with Heat index chart - add 20 degrees to chart if fully clothed and if working in direct sunlight.
		NOTE: Unacceptable field work conditions are not precise, but may include site specific conditions, general location, extreme weather conditions (e.g., icing, lightning, excessive cold or wind), travel conditions, and other factors. Professional judgment is required, and personal assessment of safety must always be individually assessed.
	Working on Ice	Assess relative load bearing capacity of ice on lakes, ponds and other waterways. If unsure do not venture onto the ice.

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS

GZA Job Tasks	Potential Hazards	Controls
		Wear proper footwear modified for traction on ice.
	Electrical storms	If lightning is observed during drilling activities, work shall be suspended immediately and employees shall find suitable shelter (building or vehicle at minimum). Work will commence no sooner than 30 minutes after the last indications of lightning have been observed
		Seek shelter inside a walled building or your vehicle.
		Open picnic pavilions and under trees are not adequate shelters.
		Assess vulnerability to lightning strikes as soon as thunder is heard on the horizon. Open areas and higher elevations are more susceptible to strikes.
		Tall objects such as metal towers and flag poles may attract lightning.
		Consult internet weather radar tracking devices to learn of impending storm patterns proximal to your work area.
	High Winds	Avoid working at high elevations, elevated platforms, and other exposed areas during high wind conditions.
		Assess work area for equipment that may be blown down, over, or carried aloft by high winds.
Working in areas without sanitary facilities	Hygiene related hazards	Provide hand washing kits (e.g., baby wipes, hand sanitizers, paper towels, bottled water, etc.) to be used prior to eating and drinking.
		Have garbage bags handy to collect trash.
Working in remote areas	Emergency Conditions	Be familiar with onsite emergency procedures and route to nearest hospital.
		Have a first aid kit available; know its contents and how to use them.
		Carry a cell phone during all field work for emergency purposes, and confirm the nearest location of cell phone signal on site prior to start of worksite.
	Disorientation	Plan your route and anticipated progress prior to field work.

GZA GEOENVIRONMENTAL, INC.
JOB HAZARD ANALYSIS WORKSHEET

Job: General Outdoor Field Work		
Analysis By: Anthony Zemba, CHMM	**Reviewed By: Guy Dalton**	**Approved By: Jayanti Chatterjee , CIH**
Date: June 25, 2012	**Date: June 25, 2012**	**Date: July 12, 2012**

Task 21.1
General Outdoor Field Work

HAZARD CONTROLS		
GZA Job Tasks	**Potential Hazards**	**Controls**
		Have multiple navigation aids (e.g., USGS Map, compass, GPS, etc.) and know how to use them before entering field. Remember to have charged batteries and battery back-ups for electronic devices.
		Share your progress plan with office staff prior to entering the field.
		Check in with office personnel periodically to update progress.
		Review and comply with GZA's Working Alone Policy 03-1009 in advance of working alone on a project site.
	Hunting	Be familiar with the various game hunting seasons. Follow rules and guidelines for remaining visible to hunters.
		Try to plan work around active hunting seasons or daily peak hunting hours as warranted.

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722 88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:

Neoprene or rubber gloves.

Respiratory/Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:

Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **BR Conventional Gasoline with EtOH**
Uses : Fuel for spark ignition engines designed to run on unleaded fuel.

Manufacturer/Supplier : **Shell Oil Products US**
PO BOX 4453
Houston, TX 77210-4453
USA
MSDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity	CAS No.	Concentration
Ethanol	64-17-5	5.00 - 10.00 %
Gasoline		90.00 - 95.00 %

Contains Alkanes, Cycloalkanes, Alkenes and Aromatic Hydrocarbons, Mixture.
Contains 1,2,4 Tri-methyl-benzene, CAS# 95-63-6
Contains Styrene, CAS # 100-42-5.
Contains Benzene, CAS # 71-43-2.
Contains Toluene, CAS # 108-88-3.
Contains Ethylbenzene, CAS # 100-41-4.
Contains n-Hexane, CAS # 110-54-3.
Contains Xylene (Mixed Isomers), CAS # 1330-20-7.
Contains Naphthalene, CAS # 91-20-3.
Contains Cyclo-hexane, CAS# 110-82-7.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Bronze. Clear, bright liquid. Hydrocarbon.

Health Hazards : Harmful: may cause lung damage if swallowed. Irritating to skin. Vapours may cause drowsiness and dizziness. A component or components of this material may cause cancer. This product contains benzene which may cause leukaemia (AML acute myelogenous leukaemia).

Safety Hazards : Extremely flammable. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Electrostatic charges may be generated during handling. Electrostatic discharge may cause fire.

Environmental Hazards : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Health Hazards

Inhalation	:	Vapours may cause drowsiness and dizziness.Slightly irritating to respiratory system.
Skin Contact	:	Irritating to skin.
Eye Contact	:	Moderately irritating to eyes.
Ingestion	:	Harmful: may cause lung damage if swallowed.
Other Information	:	Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Blood-forming organs. Peripheral nervous system. May cause heritable genetic damage. Possible risk of harm to the unborn child. A component or components of this material may cause cancer. This product contains benzene which may cause leukaemia (AML acute myelogenous leukaemia).
Signs and Symptoms	:	Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Damage to blood-forming organs may be evidenced by: a) fatigue and anaemia (RBC), b) decreased resistance to infection, and/or excessive bruising and bleeding (platelet effect). Peripheral nerve damage may be evidenced by impairment of motor function (incoordination, unsteady walk, or muscle weakness in the extremities, and/or loss of sensation in the arms and legs). Eye irritation signs and symptoms may include a burning sensation and a temporary redness of the eye. Auditory system effects may include temporary hearing loss and/or ringing in the ears.
Aggravated Medical Condition	:	Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Blood-forming organs. Peripheral nervous system. Skin.
Environmental Hazards	:	Toxic to aquatic organisms. May cause long-term adverse effects in the environment. Unlike other gasoline components, ethanol is miscible with water.
Additional Information	:	This product is intended for use in closed systems only.

4. FIRST AID MEASURES

Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical

facility for additional treatment.

Eye Contact	:	Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persist, transport to the nearest medical facility for additional treatment.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (37° C), shortness of breath, chest congestion or continued coughing or wheezing.
Advice to Physician	:	Treat symptomatically. In cases of ingestion, consider gastric lavage. Gastric lavage must only be undertaken after cuffed endotracheal intubation in view of the risk of aspiration. Administration of carbon for medicinal use (carbo medicinalis) may reduce absorption from the digestive tract. Persons on disulfiram (Antabuse®) therapy should be aware that the ethyl alcohol in this product is hazardous to them just as is alcohol from any source. Disulfiram reactions (vomiting, headache and even collapse) may follow ingestion of small amounts of alcohol and have also been described from skin contact.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	-40 °C / -40 °F
Upper / lower Flammability or Explosion limits	:	1.3 - 7.6 %(V)
Auto ignition temperature	:	> 250 °C / 482 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.
Additional Advice	:	Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Observe all relevant local and international regulations. Avoid contact with skin, eyes and clothing. Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly. If contamination of sites occurs remediation may require specialist advice. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Take precautionary measures against static discharges.

Protective measures : Vapour can travel for considerable distances both above and below the ground surface. Underground services (drains, pipelines, cable ducts) can provide preferential flow paths. Do not breathe fumes, vapour. Take measures to minimise the effects on groundwater. Contain residual material at affected sites to prevent material from entering drains (sewers), ditches, and waterways. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting
water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Clean Up Methods : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional Advice : Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26. U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Chapter 15) to the National Response Centre at (800) 424-8802. Under Section 311 of the Clean Water Act (CWA) this material is considered an oil. As such, spills into surface waters must be reported to the National Response Centre at (800) 424-8802. This material is

covered by EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Petroleum Exclusion. Therefore, releases to the environment may not be reportable under CERCLA.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Air-dry contaminated clothing in a well-ventilated area before laundering. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Prevent spillages. Turn off all battery operated portable electronic devices (examples include: cellular phones, pagers and CD players) before operating gasoline pump. Do not use as a cleaning solvent or other non-motor fuel uses. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier.

Handling : When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Never siphon by mouth. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Avoid exposure.

Storage : Drum and small container storage: Keep containers closed when not in use. Drums should be stacked to a maximum of 3 high. Packaged product must be kept tightly closed and stored in a diked (bunded) well-ventilated area, away from, ignition sources and other sources of heat. Use properly labelled and closeable containers. Take suitable precautions when opening sealed containers, as pressure can build up during storage. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.

Product Transfer : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling

(for large storage tanks) before opening hatches or manholes.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE), polypropylene (PP), and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.

Unsuitable Materials : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene. However, some may be suitable for glove materials.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers. Gasoline containers must not be used for storage of other products.

Additional Information : Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Gasoline, low boiling point naphtha	ACGIH	TWA	300 ppm		
Gasoline, low boiling point naphtha	ACGIH	STEL	500 ppm		
Ethanol	ACGIH	STEL	1,000 ppm		
Ethanol	OSHA Z1	PEL	1,000 ppm	1,900 mg/m3	
Ethanol	OSHA Z1A	TWA	1,000 ppm	1,900 mg/m3	
Xylene	ACGIH	TWA	100 ppm		
Xylene	ACGIH	STEL	150 ppm		
Xylene	OSHA Z1	PEL	100 ppm	435 mg/m3	
Xylene	OSHA Z1A	TWA	100 ppm	435 mg/m3	
Xylene	OSHA Z1A	STEL	150 ppm	655 mg/m3	
Toluene	ACGIH	TWA	20 ppm		
Toluene	ACGIH	SKIN_DES			Can be absorbed through the skin.
Toluene	OSHA Z1A	TWA	100 ppm	375 mg/m3	

Toluene	OSHA Z1A	STEL	150 ppm	560 mg/m3	
Toluene	SHELL IS	TWA	50 ppm		
1,2,4-trimethylbenzene	ACGIH	TWA	25 ppm		
1,2,4-trimethylbenzene	OSHA Z1A	TWA	25 ppm	125 mg/m3	
Benzene	ACGIH	TWA	0.5 ppm		
Benzene	ACGIH	STEL	2.5 ppm		
Benzene	ACGIH	SKIN_DES			Can be absorbed through the skin.
Benzene	OSHA	REF			
Benzene	OSHA	TWA	1 ppm		
Benzene	OSHA	STEL	5 ppm		
Benzene	OSHA	OSHA_ACT	0.5 ppm		
Benzene	OSHA Z1A	TWA	1 ppm		
Benzene	OSHA Z1A	STEL	5 ppm		
Ethylbenzene	ACGIH	TWA	100 ppm		
Ethylbenzene	ACGIH	STEL	125 ppm		
Ethylbenzene	OSHA Z1	PEL	100 ppm	435 mg/m3	
Ethylbenzene	OSHA Z1A	TWA	100 ppm	435 mg/m3	
Ethylbenzene	OSHA Z1A	STEL	125 ppm	545 mg/m3	
n-hexane	ACGIH	TWA	50 ppm		
n-hexane	ACGIH	SKIN_DES			Can be absorbed through the skin.
n-hexane	OSHA Z1	PEL	500 ppm	1,800 mg/m3	

n-hexane	OSHA Z1A	TWA	50 ppm	180 mg/m3	
Cyclohexane	ACGIH	TWA	100 ppm		
Cyclohexane	OSHA Z1	PEL	300 ppm	1,050 mg/m3	
Cyclohexane	OSHA Z1A	TWA	300 ppm	1,050 mg/m3	
Styrene	ACGIH	TWA	20 ppm		
Styrene	ACGIH	STEL	40 ppm		
Styrene	OSHA Z1A	TWA	50 ppm	215 mg/m3	
Styrene	OSHA Z1A	STEL	100 ppm	425 mg/m3	
Naphthalene	ACGIH	TWA	10 ppm		
Naphthalene	ACGIH	STEL	15 ppm		
Naphthalene	ACGIH	SKIN_DES			Can be absorbed through the skin.
Naphthalene	OSHA Z1	PEL	10 ppm	50 mg/m3	
Naphthalene	OSHA Z1A	TWA	10 ppm	50 mg/m3	
Naphthalene	OSHA Z1A	STEL	15 ppm	75 mg/m3	

Additional Information : Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes.
Shell has adopted as Interim Standards the OSHA Z1A values that were established in 1989 and later rescinded. SHELL IS is the Shell Internal Standard.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select

respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. All respiratory protection equipment and use must be in accordance with local regulations.
Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Hand Protection	:	Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
Eye Protection	:	Chemical splash goggles (chemical monogoggles).
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Bronze. Clear, bright liquid.
Odour	:	Hydrocarbon.
Freezing Point	:	-58 °C / -72 °F
Flash point	:	-40 °C / -40 °F
Upper / lower Flammability or Explosion limits	:	1.3 - 7.6 %(V)
Auto-ignition temperature	:	> 250 °C / 482 °F
Specific gravity	:	0.72 - 0.76
Density	:	ca. 0.78 g/cm3 at 15 °C / 59 °F
Water solubility	:	Negligible.
Kinematic viscosity	:	< 1 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	3.5

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Acute Oral Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rat Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Dermal Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Low toxicity: LC50 >20 mg/l / 1.00 h, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Skin Irritation	:	Irritating to skin.
Eye Irritation	:	Moderately irritating to eyes (but insufficient to classify).
Respiratory Irritation	:	Based on human experience, breathing of vapours or mists may cause a temporary burning sensation to nose, throat and lungs.
Sensitisation	:	Not a skin sensitiser.
Repeated Dose Toxicity	:	Kidney: caused kidney effects in male rats which are not considered relevant to humans Blood-forming organs: repeated exposure affects the bone marrow. (Benzene) Peripheral nervous system: repeated exposure causes peripheral neuropathy in animals. (n-hexane)
Mutagenicity	:	May cause heritable genetic damage. (Benzene) Mutagenicity studies on gasoline and gasoline blending streams have shown predominantly negative results.
Carcinogenicity	:	Known human carcinogen. (Benzene) May cause leukaemia (AML - acute myelogenous leukemia). (Benzene) Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans.

Material	:	**Carcinogenicity Classification**
Gasoline, low boiling point naphtha	:	ACGIH Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Gasoline, low boiling point naphtha	:	IARC 2B: Possible carcinogen.
Xylene	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Xylene	:	IARC 3: Classification not possible from current data.
Toluene	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Toluene	:	IARC 3: Classification not possible from current data.
Ethanol	:	ACGIH Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Benzene	:	ACGIH Group A1: Confirmed human carcinogen.
Benzene	:	NTP: Known carcinogen.
Benzene	:	IARC 1: Human carcinogen.
Benzene	:	OSHASP: Cancer hazard.
Ethylbenzene	:	ACGIH Group A3: Confirmed animal carcinogen with unknown relevance to humans.

Ethylbenzene	:	IARC 2B: Possible carcinogen.
Naphthalene	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Naphthalene	:	NTP: Anticipated carcinogen.
Naphthalene	:	IARC 2B: Possible carcinogen.
Styrene	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Styrene	:	IARC 2B: Possible carcinogen.

Reproductive and Developmental Toxicity : Causes foetotoxicity at doses which are maternally toxic. (Toluene)
Causes adverse effects on the foetus based on animal studies. (Toluene)
Many case studies involving abuse during pregnancy indicate that toluene can cause birth defects, growth retardation and learning difficulties. (Toluene)
Ethanol, a component of this material, may cause birth defects and/or miscarriages following high oral doses.

Additional Information : Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.
Prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. (Toluene)
Abuse of vapours has been associated with organ damage and death. (Toluene)
Myelodysplastic syndrome (MDS) was observed in individuals exposed to very high levels (50 ppm to 300 ppm range) of benzene over a long period of time in the workplace. The relevance of these results to lower levels of exposure is not known. (Benzene)

12. ECOLOGICAL INFORMATION

Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity : Toxic: LL/EL/IL50 1-10 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).

Mobility : Floats on water. Evaporates within a day from water or soil surfaces. Large volumes may penetrate soil and could contaminate groundwater. Contains volatile constituents.

Persistence/degradability : Major constituents are expected to be inherently biodegradable. The volatile constituents will oxidize rapidly by photochemical reactions in air.

Bioaccumulation : Contains constituents with the potential to bioaccumulate.

Other Adverse Effects : Films formed on water may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Material Disposal : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination.

Container Disposal : Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not, puncture, cut, or weld uncleaned drums. Send to drum recoverer or metal reclaimer. Do not pollute the soil, water or environment with the waste container.

Local Legislation : Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)

Identification number	UN 1203
Proper shipping name	Gasohol
Class / Division	3
Packing group	II
Emergency Response Guide No .	128
Additional Information	Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule.

IMDG

Identification number	UN 1203
Proper shipping name	GASOLINE
Class / Division	3
Packing group	II
Marine pollutant:	No

IATA (Country variations may apply)

Identification number	UN 1203

Proper shipping name	Gasoline
Class / Division	3
Packing group	II

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA)

BR Conventional Gasoline with EtOH ()

Gasoline, low boiling point naphtha ()	Reportable quantity: 100 lbs
Xylene (1330-20-7)	Reportable quantity: 100 lbs
Toluene (108-88-3)	Reportable quantity: 1000 lbs
Ethanol (64-17-5)	Reportable quantity: 100 lbs
Benzene (71-43-2)	Reportable quantity: 10 lbs
Ethylbenzene (100-41-4)	Reportable quantity: 1000 lbs
n-hexane (110-54-3)	Reportable quantity: 5000 lbs
Naphthalene (91-20-3)	Reportable quantity: 100 lbs
Cyclohexane (110-82-7)	Reportable quantity: 1000 lbs
Styrene (100-42-5)	Reportable quantity: 1000 lbs

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

Clean Water Act (CWA) Section 311

Xylene (1330-20-7)	Reportable quantity: 100 lbs

Toluene (108-88-3)	Reportable quantity: 1000 lbs
Benzene (71-43-2)	Reportable quantity: 10 lbs
Ethylbenzene (100-41-4)	Reportable quantity: 1000 lbs
Naphthalene (91-20-3)	Reportable quantity: 100 lbs
Cyclohexane (110-82-7)	Reportable quantity: 1000 lbs
Styrene (100-42-5)	Reportable quantity: 1000 lbs

Under Section 311 of the Clean Water Act (CWA) this material is considered an oil. As such, spills into surface waters must be reported to the National Response Centre at (800) 424-8802.

SARA Hazard Categories (311/312)
Immediate (Acute) Health Hazard. Delayed (Chronic) Health Hazard. Fire Hazard.

SARA Toxic Release Inventory (TRI) (313)

Xylene (1330-20-7)
Toluene (108-88-3)
1,2,4-trimethylbenzene (95-63-6)
Benzene (71-43-2)
Ethylbenzene (100-41-4)
n-hexane (110-54-3)
Naphthalene (91-20-3)
Cyclohexane (110-82-7)
Styrene (100-42-5)

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This product contains a chemical known to the State of California to cause cancer.
Known to the State of California to cause birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Xylene (1330-20-7)	Listed.
Toluene (108-88-3)	Listed.
Ethanol (64-17-5)	Listed.
1,2,4-trimethylbenzene (95-63-6)	Listed.
Benzene (71-43-2)	Listed.
Ethylbenzene (100-41-4)	Listed.
n-hexane (110-54-3)	Listed.

Naphthalene (91-20-3)	Listed.
Cyclohexane (110-82-7)	Listed.
Styrene (100-42-5)	Listed.

Pennsylvania Right-To-Know Chemical List

Gasoline, low boiling point naphtha ()	Listed.
Xylene (1330-20-7)	Environmental hazard. Listed.
Toluene (108-88-3)	Environmental hazard. Listed.
Ethanol (64-17-5)	Listed.
1,2,4-trimethylbenzene (95-63-6)	Environmental hazard. Listed.
Benzene (71-43-2)	Special hazard. Environmental hazard. Listed.
Ethylbenzene (100-41-4)	Environmental hazard. Listed.
n-hexane (110-54-3)	Listed.
Naphthalene (91-20-3)	Environmental hazard. Listed.
Cyclohexane (110-82-7)	Environmental hazard. Listed.
Styrene (100-42-5)	Environmental hazard. Listed.

16. OTHER INFORMATION

Additional Information	:	This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.
NFPA Rating (Health, Fire, Reactivity)	:	1, 3, 0
MSDS Version Number	:	3
MSDS Effective Date	:	04/13/2009
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Uses and Restrictions	:	This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

This product is not to be used as a solvent or cleaning agent; for lighting or brightening fires; as a skin cleanser.

MSDS Distribution : The information in this document should be made available to all who may handle the product.

Disclaimer : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Appendix D

Known for excellence.
Built on trust.

COMMUNITY AIR MONITORING PLAN (CAMP)

Sloop Brewery/Building 338
Former IBM East Fishkill Facility
2070 Route 52
Hopewell Junction, NY
NYSDEC Site No. 314054
EPA ID No. NYD000707901

February 19
File No. 12.0076252.10

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

GZA GeoEnvironmental, Inc.
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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 OVERVIEW 1

3.0 COMMUNITY AIR MONITORING PLAN 1

3.1 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS 2

3.2 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS 2

1.0 INTRODUCTION

The following Community Air Monitoring Plan (CAMP) is based on NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) Appendix 1A: New York State Department of Health Generic Community Air Monitoring Plan, with modification as appropriate for the scope of work to be performed at the Former IBM East Fishkill facility.

2.0 OVERVIEW

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

3.0 COMMUNITY AIR MONITORING PLAN

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. A periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

3.1 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

3.2 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment

must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background

(upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

GZA GeoEnvironmental, Inc.