Advanced Cleanup Technologies, Inc.

ENVIRONMENTAL CONSULTANTS

Periodic Review Report

Williamsburg Bridgeview Apartment
337 Berry Street
Brooklyn, New York 11249

NYSDEC BCP Site No. C224233

Prepared For:

LPC Development Group LLC
456 East 173rd Street
Bronx, NY 10457

Prepared By:

Advanced Cleanup Technologies, Inc.
110 Main Street, Suite 103
Port Washington, NY 11050

May 28, 2019

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1. Introduction

The property located at 337 Berry Street, Brooklyn, New York 11249 (the Site) has implemented a New York State Department of Environmental Conservation (NYSDEC) approved Site Management Plan (SMP) dated August 2018. A copy of the SMP is provided in Appendix A.

Advanced Cleanup Technologies, Inc. (ACT) was retained to perform operation, maintenance and monitoring activities and prepare this Periodic Review Report for the Site pursuant to the approved SMP. This report contains a summary of the current condition of institutional and engineering controls at the Site and the results of the Operation, Maintenance and Monitoring (OM&M) inspections performed to date.

2. Institutional Controls

An Environmental Easement (EE) for the Site was executed by the NYSDEC and filed with the New York City Clerk on November 2, 2018. The EE contains a series of Institutional Controls (ICs) required by the Final Engineering Report (FER) to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to restricted residential, commercial and industrial uses only. Adherence to these ICs is required by the EE and they are being implemented pursuant to the SMP.

3. Engineering Controls

Since remaining contaminated soil, groundwater and soil vapor exist beneath the Site, Engineering Controls (EC) are required to protect human health and the environment. The Site has the following primary ECs, as described in the following subsections.

A. Cover System

Exposure to remaining contamination in soil/fill at the Site is prevented by a soil cover system placed over the Site. This cover system is comprised of a minimum of 12 to 24 inches of clean soil, asphalt pavement, concrete-covered sidewalks, and/or concrete building slabs. Appendix B contains a diagram identifying the location of each cover type built at the Site. An Excavation Work Plan, which outlines the procedures required in the event the cover system and/or underlying residual contamination are disturbed, is provided in Appendix A of the SMP.

B. Sub-Slab Depressurization System (SSDS)

There is a Sub-Slab Depressurization System (SSDS) located within the building. The site SSDS consists of five (5) zones underneath the building. The zones were designed to address approximately 2,000 square feet of the building footprint. Each zone has a layer of crushed stone and geovent over the stone around its perimeter to act as a permeable layer to transmit vapors through the system. The geovent is connected to sub-slab PVC piping which transitions into cast iron piping above the concrete floor. The cast iron piping travels vertically up through the building and vents on the roof through in-line fans. The system has monitoring points to determine if a vacuum is being created in each zone, alarms should the exhaust fans shut down or air flow is blocked, and vacuum gauges to determine if there is flow. The SSDS is designed to run continuously until such time as the DEC allows for a reduction in use or

termination of the system. The layout of the active SSDS installed at the Site is provided in Appendix C.

A vapor barrier consisting of a geosynthetic membrane and liner was installed above the geovent and below the building slab. It was anchored into the foundation wall and properly sealed to make a monolithic barrier to prevent vapor intrusion into the building. The vapor barrier consists of:

- Geosynthetic membrane
- WR Grace Florprufe 120
- Preprufe Tape
- Bithuthene
- Hilti anchor system to anchor the Preprufe to the foundation walls

C. Soil Vapor Extraction System (SVES)

The SVES was installed in the parking lot area of the site to address potential vapor intrusion into neighboring properties along Berry Street. The system consists of four (4) PVC extraction points that extend approximately 15 feet below grade with a 5-foot screen and horizontal PVC piping to a package treatment plant. The horizontal piping is approximately 4-feet deep. The package plant key components include the system controls, extraction motor, and activated Carbon canisters to remove VOCs from the vapor. The system is designed to run continuously until such time as the removal rates become asymptotic or negligible and the DEC allows for a reduction of use or termination of the system. The as-built layout of the SVES is provided in Appendix D.

4. Startup Inspections

Pursuant to the approved SVES Implementation Plan contained in Appendix E, startup inspections of the SVES were performed once all piping and equipment was installed and energized.

A startup inspection of the SSDS was performed on March 26, 2019 for the purpose of collecting effluent air samples from the 5 vacuum blowers mounted on riser pipes on the roof of the recently constructed building. The laboratory results from the SSDS exhaust sampling are summarized in Table 1. The certified laboratory reports are contained in Appendix F.

Table 1

SSDS Effluent VOC Concentrations (ug/m³)
March 26, 2019

Parameter	NYSDOH Air Guideline	Sampling Location				
		SSDS-1	SSDS-2	SSDS-3	SSDS-4	SSDS-5
Tetrachloroethene	30	3.2	0.46	3.3	4.3	ND
Trichloroethene	2	1.3	ND	0.51	0.97	ND
1,1,1-Trichloroethane	NA	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NA	0.33	ND	0.32	ND	ND
NA = Not Available						
ND = Not detected above laboratory's method detection limit						

It can be seen from Table 1 that from one and three VOCs included in the NYSDOH's Decision Matrices were detected in up to four SSDS effluent samples. However, all of the VOCs were detected below applicable air guidance values. Therefore, effluent treatment of the SSDS exhaust should not be necessary.

Startup inspections of the SVES were performed on February 25th, March 11th and April 30th, 2019. During startup inspections, system pressure and flow were recorded and adjusted to maintain an optimum vacuum.

Table 2

SVES Vacuum and Flow Measurements

Date	02/25/2019	03/11/2019	04/30/2019
Blower Vac	85"	-83"	80"
SVE-1 Vac	84"	-82"	69"
SVE-2 Vac	Not Measured	-82"	63"
SVE-3 Vac	Not Measured	-80"	65"
SVE-4 Vac	Not Measured	-82"	70"
Flow (cfm)	80.5	90	79.5
PID Reading (ppb)	425	160	0
Sample Collected	No	Yes	Yes
Observations	0 PID post-carbon	System off on arrival; Water in SVE wells	System off on arrival; installed telemetry

It can be seen from Table 2 that the SVES had automatically shut down on the two inspections following startup due to a buildup of water in the moisture separator. The vacuum generated by the SVES was water was steadily reduced until the SVES no longer accumulated stormwater drainage from transient storm events.

The accumulated stormwater was subsequently drained into 55-gallon drums and left on-site pending laboratory analysis. The laboratory results indicated that a trace concentration of TCE (0.22 ug/L) was the only chemical of concern detected in the drummed water. The TCE level was well below its TOGS 1.1.1 groundwater and effluent discharge standard, so the drummed water was discharged into the municipal sewer. A remote telemetry system was also installed within the treatment shed to insure that subsequent system outages could be serviced immediately and appropriate operating adjustments made. Appendix D contains the logged telemetry data to date indicating that only one subsequent shutdown occurred on May 6, 2019, which was corrected with a final blower pressure setting of 78 inches w.c.

The laboratory results from the SVES exhaust sampling are summarized in Table 2. The certified laboratory reports are contained in Appendix F. It can be seen from Table 2 that VOC concentrations increased slightly from March to April, which is expected immediately following startup of the SVES. It can also be seen that between 99.7 and 100 percent of VOC emissions were captured by the vapor-phase granular activated carbon adsorbers installed within the treatment shed.

Table 3

SVES Influent and Effluent VOC Concentrations (ug/m^3)

Parameter	SVES Exhaust Sampling Event					
	March 11, 2019			April 30, 2019		
	Influent	Effluent	Removal (%)	Influent	Effluent	Removal (%)
Tetrachloroethene	460	0.27	99.9	550	1.4	99.7
Trichloroethene	320	ND	100	450	0.79	99.8
1,1,1-Trichloroethane	18	ND	100	17	ND	100
Cis-1,2-Dichloroethene	5.8	ND	100	15	ND	100
ND = Not detected above laboratory's method detection limit						

5. Site-wide Inspections

In accordance with the SMP, site-wide inspections of the cover system, SSDS and SVES are required at a minimum of once per year to verify that all EC's are being maintained and are functioning properly.

The first Site-wide inspection is currently scheduled to take place in October 2019 to coincide with the annual groundwater monitoring event. Additional Site-wide inspections will be performed annually thereafter.

6. Groundwater Monitoring

Annual groundwater monitoring is required in accordance with the SMP and should include the three recently installed onsite groundwater monitoring wells. According to the NYSDEC, the first annual groundwater monitoring was performed by Equity Environmental, Inc. in October 2018 and consisted of the collection and analysis of groundwater samples from the three onsite monitoring wells (MW-1, MW-2 and MW-3). All groundwater samples were analyzed for VOCs via EPA Method 8260, Per- and Poly-flouroalkyl Substances (PFAS) via USEPA Method 537, and 1,4-Dioxane via EPA Method 8270-SIM. The laboratory reports have not yet been provided to ACT for review.

The next round of groundwater monitoring will take place October 2019. The NYSDEC has not yet determined whether the analysis of PFAS will be required in subsequent groundwater monitoring events.

7. Proposed Modifications to SVES Monitoring Schedule

The SSDS and SVES engineering controls are currently functioning without nominally. The recently installed remote telemetry system indicates that the SVES has operated continuously since the system-wide vacuum was reduced to 74 in. w.c., which is producing vacuums in each SVE well ranging from 63 to 70 in. w.c. at a flow of 80 cfm.

The recently accumulated startup data indicate that influent vapor concentrations remain extremely low and over 99 percent removal efficiency with the existing vapor phase carbon treatment. In light of the SVES's stable operating conditions and the continuous 24/7/365 monitoring of SVES vacuum by the remote telemetry system, it is recommended that sampling and analysis of the SVES exhaust be reduced from monthly to quarterly.

8. Certification of Institutional and Engineering Controls

The following certification has been prepared by a Qualified Environmental Professional as per the requirements of NYSDEC DER-10:

For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- *I performed the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Paul Stewart, of Advanced Cleanup Technologies, Inc., am certifying as LPC Development Group LLC's Designated Site Representative for the site."

Paul P. Stewart, MS, QEP

Appendix A

Site Management Plan

Williamsburg Bridgeview Apartments

KINGS COUNTY

BROOKLYN, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C224233

Prepared for:

LPC Development Group LLC

456 E 173rd Street

Bronx, NY 10457

Prepared by:

Equity Environmental Engineering LLC

500 International Drive

Suite 150

Mt. Olive, NJ 07828

973/527-7451

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

AUGUST 2018

CERTIFICATION STATEMENT

I ROBERT JACKSON certify that I am currently a [NYS registered professional engineer or Qualified Environmental Professional as in defined in 6 NYCRR Part 375] and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____ QEP

AUGUST 1, 2018 DATE

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KINGS COUNTY

BROOKLYN, NEW YORK

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List of Acronyms

ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System

SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: C224233
Williamsburg Bridgeview Apartments
95-105 South 5th Street
Brooklyn, NY 11249

Institutional Controls:	1. The property may be used for restricted residential and commercial use
	2. Property Easement
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.
Engineering Controls:	1. Cover system
	2. Sub-slab depressurization system (SSDS) 3. Soil Vapor Extraction System (SVE)

Inspections:	Frequency
1. Cover inspection	Annually
Monitoring:	
1. SSDS	Quarterly
2. SVE	Monthly
Maintenance:	
1. Exhaust Fan maintenance	Quarterly
2. SVE Package Plant maintenance	Semi-annually
2. SVE Carbon Canister exchange	As required

Site Identification: C224233
Williamsburg Bridgeview Apartments
95-105 South 5th Street
Brooklyn, NY 11249

Reporting:	
1. Inspections reports	As required
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Williamsburg Bridgeview Apartments located in Brooklyn, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C224233 which is administered by New York State Department of Environmental Conservation (NYSDEC).

LPC Development Group LLC (LPC) entered into a Brownfield Cleanup Agreement on June 24, 2016 with the NYSDEC to remediate the site. The site location and boundaries are provided in Figure 2. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Kings County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375, the BCA, Site #C223233, for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix B of this SMP.

This SMP was prepared by Equity Environmental Engineering LLC (Equity), on behalf of LPC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated August , 2018, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the VCA, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the BCA, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate

contact information. A full listing of site-related contact information is provided in Appendix B.

Table 1: Notifications*

Name	Contact Information
NYSDEC Project Manager – Melissa Sweet	(518) 402-9614 New York State Department of Environmental Conservation 625 Broadway, Albany, NY 12233-7015 melissa.sweet@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O Connell	Jane O'Connell 718-482-4995 New York State Department of Environmental Conservation 47-40 21st Street Long Island City, NY 11101-5401 jane.oconnell@dec.ny.gov;
NYSDEC Site Control – Kelly Lewandowski	Kelly Lewandowski (518)402-9553 New York State Department of Environmental Conservation 625 Broadway, Albany, NY 12233-7015 Kelly.lewandowski@dec.ny.gov,

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in Brooklyn, Kings County, New York and is identified as Block 2443 and Lot 6 (formerly lots 6, 37, and 41) on the Williamsburg Tax Map (see Figure 3). The site is an approximately one-third-acre area and is bounded by Berry Street to the north, residential property to the east, commercial property to the west, and South 5th Street to the south (see Figure 2 – Site Layout Map). The boundaries of the site are more fully described in Appendix A –Environmental Easement. The Beneficial Owner of the site parcel at the time of issuance of this SMP is LPC Development Group, LLC (LPC). On June 29, 2016 the Property was deeded from the City of New York to LPC Development Group LLC which Property was then immediately deeded from LPC Development Group LLC to Williamsburg Bridgeview Apartments Housing Development Fund Corporation. The Property was simultaneously encumbered by a Declaration of Interest and Nominee Agreement which provides LPC Development Group LLC with the beneficial interest in the Property and keeps the legal fee interest in the Property with Williamsburg Bridgeview Apartments Housing Development Fund Corporation.

LPC Development Group, as the beneficial owner of the Property has all control over the Property.

2.2 Physical Setting

2.2.1 Land Use

The Site consisted of an abandoned warehouse and undeveloped land. The Site is zoned as manufacturing with a residential overlay (M1-2/R6) designation and is currently has an 11 story residential building with limited parking. Site occupants will include the building residents, and future community or commercial uses.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential mixed use properties. The properties immediately south of the entire Site include South 5th Street and the Williamsburg Bridge underpass; the properties immediately north of the Site include residential properties; the properties immediately east of the Site include commercial and residential properties; and the properties to the west of the Site include residential properties.

2.2.2 Geology

Fill material was observed throughout all borings at different depths between 0-5 feet bgs. Soils consisted of well-graded sand with silt (ranging from fine to coarse sands) and well well-graded sand (ranging from fine to coarse). Small to large sized gravel and cobbles were observed throughout all borings. Bedrock was encountered at 39 feet bgs at MW-3, 42 feet bgs at MW-2 and 27 feet bgs at MW-4. Bedrock was not encountered in MW-1 which suggests that bedrock slopes downward to the north with the topography towards the East River. Groundwater was encountered at all wells at approximately 45-47 feet bgs.

Soil boring logs are provided in Appendix C.

2.2.3 Hydrogeology

Groundwater was encountered at approximately 45 below ground surface (bgs) in the three monitoring wells (MW-1, MW-2, and MW-4) installed during the remedial investigation. Groundwater flow is generally west towards the East River. There are no known private or public water supply wells in the area. Groundwater monitoring well construction logs for the remedial investigation are provided in Appendix D. Groundwater monitoring construction logs for the permanent wells will be provided when available.

2.3 Investigation and Remedial History

Former lot 6 was owned by the city of New York. On June 29, 2016 the Property was deeded from the City of New York to LPC Development Group LLC which Property

was then immediately deeded from LPC Development Group LLC to Williamsburg Bridgeview Apartments Housing Development Fund Corporation. The Property was simultaneously encumbered by a Declaration of Interest and Nominee Agreement which provides LPC Development Group LLC with the beneficial interest in the Property and keeps the legal fee interest in the Property with Williamsburg Bridgeview Apartments Housing Development Fund Corporation.

LPC Development Group, as the beneficial owner of the Property has all control over the Property.

Prior to the Ownership the New York City Landmarks Preservation Commission (LPC) started an architectural salvage program at the warehouse on the Site in 1980 to reuse discarded elements from buildings throughout the City. Salvaged items such as doors, windows, fences, and decorative elements, were sold to the public at low rates to restore historic buildings. The program ended in 2000 due to budgetary constraints. In the 2005 Greenpoint-Williamsburg Points of Agreement, the City identified this Site as a location for future affordable housing development.

Former lots 37 and 41 were originally housed with two story residential buildings from ca. 1868. They were connected to the sewer system probably in the same year or shortly before. Lot 37 was originally divided into 3 lots (37, 38 and 39). According to the Archaeological Field Investigation that was completed by Historical Perspectives in July 2015 on behalf of the Applicant, lots 37 and 39 do not have any history of the owner living at the address and therefore not possible to trace the building's history of occupation. Former lot 38 was a two and a half story building owned by David Downing and occupied by an engineer named Daniel Downing in the late 1800's. There is no further history on NYC ACRIS in regards to subsequent ownership except for the foreclosure of a tax lien from the Commissioner of Finance conveyed to The City of New York on May 28, 1986.

Pursuant to NYC ACRIS lot 41 was previously owned by Ellen L. Goodrich and Leo W. Goodrich and conveyed to William and Clarence Goodrich on May 4, 1925. On November 21, 1972, both William and Clarence Goodrich then conveyed property to

Eleanora Donop. Subsequently, in an action to foreclose certain tax liens owned and held by the City of New York the Commissioner of Finance also conveyed lot 41 to The City of New York on May 28, 1986.

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

A Phase I Environmental Site Assessment was completed on 8/20/13 by Hillmann Consulting LLC.

A Phase II was conducted onsite in multiple phases from October 2015 and January 2016 and evaluated the onsite contamination in soil, soil vapor, and groundwater. It also included the offsite vapor intrusion investigation. It was the basis for an Interim Remedial Workplan (IRMWP).

The IRMWP covered the design for the soil excavation, the design and installation of the Sub-Slab Depressurization System (SSDS), and the design of the Soil Vapor Extraction (SVE) system. The IRMWP was completed in August 2016.

A Preliminary Phase II Investigation Report was prepared and submitted to the DEC in November 2016.

During the implementation of the IRM, five (5) underground storage tanks (USTs) were discovered onsite at various times throughout 2017. The USTs were properly cleaned out, disposed of, and the disposition recorded with the DEC. The reports on the UST closures were included in the Construction Closure Report (CCR).

A CCR was prepared to document the implementation of the IRM. The final version of the CCR was completed in March 2018.

A Decision Document was issued by the DEC on September 27, 2017.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated September 27, 2018, are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

2.5.1 Soil

- The end-point sampling conducted onsite after the soil was excavated and removed, indicated that metals were the only contaminants detected above the site SCOs: Part 375-6 unrestricted residential, restricted residential, an residential standards. Two volatile organic compounds, and numerous semi-volatile organic compounds were detected but none above an applicable SCO.

Table 2 summarizes the results of all soil samples collected that exceeded the Unrestricted Use SCOs and the residential and restricted residential. Figure 4 shows the end-point sampling locations and the mercury exceedance and applicable SCOs at the site after completion of remedial action. The applicable data reports and Date Usability Summary Reports (DUSRs) were submitted in the CCR.

2.5.3 Groundwater

Groundwater was encountered at approximately 45 feet below ground surface (bgs) in four (4) monitor wells installed in the Phase II investigation and based on topography, the flow is believed to be west towards the East River. Four (4) groundwater samples were collected and the analytical results indicate that there may be an up-gradient source of contamination that exceeds the DEC TOGS Class GA GW groundwater limits for PCE and TCE. MW-4 was the only well in which the concentration of TCE was below the regulatory limits. Several metals were detected in the groundwater samples. Iron, sodium, silver, and manganese were identified within the samples above regulatory limits for groundwater. A summary table of data for chemical analyses performed on groundwater samples is included in Table 3. Figure 5 shows the groundwater exceedances. The investigation and proposed permanent monitoring wells are shown on Figure 6.

Three new monitoring wells will be installed for long term monitoring of the site as required by the NYSDEC. The new wells will be installed as shown on Figure 6.

2.5.5 Soil Vapor

Six (6) soil vapor samples were collected in accordance with the requirements in the most current NYSDOH guidance. Approximately 30 compounds, many of which were chlorinated, were detected in varying levels of concentrations in the six samples. In the parking lot area the concentrations were three orders of magnitude higher. The highest concentrations of Tetrachloroethylene (PCE), Trichloroethene (TCE) and 1,1,1-Trichloroethane (TCA) are located where the proposed development parking lot will be constructed. There was a problem with sampling equipment for SG-5 and results were presented for discussion purposes only and the data is not considered valid.

Five (5) additional sub-slab, soil vapor samples were collected during the second phase of the RI. TCE was detected above the regulatory limits in four of the five (5) samples with the exception being SS-12. TCE was detected in four (4) of the samples (i.e. SS-10, SS-11, SS-13, and SS-14).

Soil vapor and indoor air samples were collected offsite in neighboring properties and found to have high concentrations of PCE and TCE.

The majority of the soil vapor samples were collected under the former warehouse (sub-slab). Three samples were not collected from under the building. There is not a direct correlation between detected contaminants in the soil, soil vapor, and groundwater data. The concentrations of VOCs in soil were generally low. The concentrations of VOCs in groundwater were also low, however, similar contaminants were found in the groundwater and soil vapor and this would support a determination that groundwater migrating under the site has served as a potential source. However, given the stratigraphy on the site and the vertical distance between groundwater and the depth of the soil vapor samples, there is not a strong line of evidence that groundwater is the source of the soil vapor contaminants.

Under these circumstances, the historic USTs that were removed from the site remain the suspected source of contaminated soil vapor.

Table 4 and Figure 7summarize the results of all samples of soil vapor that exceed the SCGs after completion of the remedial action.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix E) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to restricted residential

and commercial uses only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are the entire site. These ICs are:

- The property may be used for: restricted residential and as a commercial activity facility ;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Kings Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries or entire site, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited;

3.3 Engineering Controls

3.3.1 Cover

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of asphalt pavement, concrete-covered sidewalks, and concrete building slabs, and a small landscaped area with 2-feet of clean fill. Figure 8 presents the location of the cover system and engineering controls. The Excavation Work Plan (EWP) provided in Appendix E outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in Appendix F.

3.3.2 Other ECs: Sub-slab Depressurization Systems; Soil Vapor Extraction Systems

The Sub-slab Depressurization System (SSDS) consists of five (5) zones and has been installed to remove vapor that potentially could infiltrate the sub-grade portion of the building and impact onsite residents. The system addresses the entire footprint of the building and was started on June 2018. The system consists of vapor barrier and extraction points piped to the roof with a vacuum created by exhaust fans on the roof. The vapor barrier consists of a layer of crushed stone, geovent (permeable transmission layer), a geosynthetic liner, PVC sub-grade and cast iron above grade piping through the roof of the building. There are exhaust fans are connected in-line to the piping on the roof and create a vacuum for each zone of the building. Each zone contains sampling points, vacuum gauges, and an alarm system should the exhaust fan shut down or air flow dramatically

decreases. The system is designed to run continuously until such time as the DEC and the New York State Department of Health (DOH) permits reduction in operations or termination of the system.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix G – Operations and Maintenance Manual. Figure 7 shows the location of the ECs for the site.

The Soil Vapor Extraction (SVE) system was installed in the driveway/parking lot of the site. The SVE system was installed to contain onsite vapors from migrating offsite into neighboring residential properties. The system consists of four (4) extraction points connected to a PVC pipe gallery that terminates at a skid mounted, package plant that includes the necessary controls, a blower system and multiple, activated carbon canisters. There are sample points on the system to measure the contaminant concentrations in the system and to determine when the canisters need to rotated out of service. The system is designed to run continuously until such time as removal rates reach asymptotic concentrations and the DEC and DOH allows for the reduced operation or termination of the system.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix G – Operations and Maintenance Manual. Figure 7 shows the location of the ECs for the site.

3.3.3 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision

document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

3.3.3.1 - Cover

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.3.3.2 - Sub-Slab Depressurization (SSD) System

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH.

3.3.3.3 - Soil Vapor Extraction System (SVE) System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC and DOH. In the event that monitoring data indicates that the SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the SVE system include contaminant concentrations in groundwater and/or soil that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in Appendix H.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix I – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date; and

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the SSDS and SVE systems will be performed on a routine basis, as identified in Table 6 Remedial System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSDS and/or SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSDS and SVE system components to be monitored include, but are not limited to, the components included in Table 5 below.

Table 5 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Sub-slab Depressurization	Vacuum and Flow Rate	0.01 in of hg	Quarterly
Soil Vapor Extraction	Compressor Vacuum Blower Pressure Gauges Influent Effluent		Monthly

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix I - Site Management Forms. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

4.3.2 Remedial System Sampling

Effluent sampling will be conducted for the SSDS. Influent and effluent sampling will be done for the SVE system. Air samples shall be collected from the SSDS and SVE systems on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 6 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 6 – Remedial System Sampling Requirements and Schedule

Sampling Location	Schedule	
	VOC (EPA Method TO-15)	
SSDS zones 1-5	X	Annually
SVE	X	Monthly

Detailed analytical procedures and protocols are provided in Appendix H – Quality Assurance Project Plan. Detailed sample collection procedures are explained the Field Sampling Plan in Appendix J. The sampling procedures will comply with the most current version of the DOH Vapor Intrusion Guidance.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the proposed monitoring wells and indoor air on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 7 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 7 – Post Remediation Sampling Requirements and Schedule

Sampling Location		Schedule				
	VOCs Method 8260)	SVOCs & Pesticides Method 8270& 8081	TAL Metals Method 6010C/ 7471B	PFAs Method 537	VOC (EPA Method TO-15)	
Monitoring Well #1, 2, and 3	X	X	X	X		Annually

Indoor air					X	Annually inside basement of building

Detailed analytical procedures and protocols are provided in Appendix H – Quality Assurance Project Plan. Samples will be collected in accordance with the requirements in DER-10.

4.4.3 Groundwater Sampling

Groundwater monitoring will be performed annually to assess contaminant concentrations. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells will be installed to monitor upgradient and downgradient groundwater conditions at the site.

The well identification number, as well as the purpose, location, depths, diameter, and screened intervals of the wells will be provided upon completion. As part of the groundwater monitoring, three on-site wells will be sampled to evaluate the quality of the groundwater.

Monitoring well construction logs will be provided upon completion

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.5 Soil Vapor Sampling

Soil vapor sampling will be performed indirectly through the SVE system influent to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

4.4.6 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling will be performed annually inside the basement of the building to assess the performance of the remedy. Offsite locations will be monitored on an annual basis by the DEC. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of on-site vapor intrusion sample locations has been designed based providing coverage throughout the basement of the building and the samples will analyzed for TO+15. The air samples will be analyzed by an ELAP approved laboratory.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the soil vapor intrusion sampling program are specified in Section 7.0 – Reporting Requirements.

4.4.7 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix I - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Sampling Plan provided as Appendix J of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the site to operate and maintain the SSDS and SVE systems;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSDS and SVE systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the SSDS and SVE is provided in Appendix G - Operation and Maintenance Manual. A copy of this Operation and Maintenance Manual, along with the complete SMP, is to be maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

5.2 Remedial System Performance Criteria

The Remedial system performance criteria is included in the O&M manuals for each system and provided in Appendix H.

5.3 Operation and Maintenance of SSDS

The following sections provide a description of the operations and maintenance of the SSDS. Cut-sheets and as-built drawings for the SSDS are provided in Appendix G - Operations and Maintenance Manual. All discharge permits or permit equivalencies are provided in Appendix L.

5.3.1 System Start-Up and Testing

The system start-up, testing, and operations followed the prescribed steps in the O&M manual for the SSDS and SVE mechanical components. The Pre start-up inspections included all visible components of the system. For both the SSDS and SVE systems, a large part of the system is underground. Pressure gauges should fit snuggly into the piping. The alarms shall be tested to ensure that if the power is cut, they will activate.

For the SSDS, the piping shall be inspected to ensure there are no leaks, loose joints, etc. A micro-manometer will be used to test for a vacuum in each zone.

For the SVE system, an inspection of the piping similar to that for the SSDS will take place. In addition, a complete implementation of the start-up steps will be completed in accordance with the O&M manual. The results of the pre start-up tests will be recorded and maintained onsite.

Baseline sampling of both systems will take place as soon as possible after start-up to determine initial sub-surface vapor conditions. Air samples will be collected from the basement and the SSDS piping before the exhaust fans for TO+15 analysis. Air samples from the SVE system will be collected at an influent and effluent point as well as between carbon canisters to obtain initial subsurface conditions and removal efficiency.

The system testing described above will be conducted if, in the course of the systems lifetimes, they go down or significant changes are made to the systems and they must be restarted.

5.3.2 Routine System Operation and Maintenance

Routine SSDS and SVE Operations and Maintenance will follow the manufacturer's recommendations for the various components of each system. Inspections will be completed per the Remedial Systems Inspection Schedule on Table 5. If either system is

not operating properly, the troubleshooting guidance will be consulted first and if that does not provide the necessary answers to address the situation, the system's technical advisors will be contacted. Both systems are designed to operate continuously until such time as they need to be replaced or the DEC and DOH permit a reduction in operation or termination of either system.

There are few adjustments that can be made to the SSDS. Repairs will be made as required during the operating life of the exhaust fans.

The SVE system will be adjusted based on the removal efficiency and the offsite vapor intrusion data from the DEC. Adjustments may include shutting down a portion of the extraction points so that no air is being evacuated, reducing the rate of the mechanical blowers, sizing of the carbon canisters, etc. Any of these adjustments will be made only with the approval of the DEC and/or DOH. Other adjustments may be made based solely on the mechanical operation of the equipment when necessary.

A copy of an Operations and Maintenance Manual specific to the remedial systems is provided in Appendix G, which will provide further detail on the above.

5.3.3 Non-Routine Operation and Maintenance

Non-routine O&M will be done as an as-needed basis given the current situation. Those situations could include the activation of warning devices or alarms, damage done to system components deliberately or from storms, reduced effectiveness not associated with the reduction in concentrations of contaminants, and/or if it is time for parts replacement sooner than anticipated. The maintenance will be conducted as required and the system will be thoroughly inspected to determine why the non-routine measures were needed. They reasons for the non-routine maintenance may be indicative of some larger operational issues or changes in site conditions which need to be understood.

A summary and schedule of routine maintenance for both systems are provided in Appendix G.

5.3.4 System Monitoring Devices and Alarms

The SSDS system has alarm devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS system will be restarted. Operational problems will be noted in the Periodic Review Report (PRR) to be prepared for that reporting period.

The SVE system has numerous warning devices for the monitoring of various components of the system. The system has monitoring devices and alarm notifications for SVE vacuum blower failure, pressures and temperatures out of operating range, and the accumulation of water in the system, etc.

The SVE system has warning devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period. The warnings will be addressed with the necessary maintenance, reset and noted in the inspection log, PRR.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

High Wind: The site is susceptible to damage from high winds as the SSDS exhaust fans are located on the roof of the building. Even if properly anchored, given strong enough winds, they may be knocked off their piping and rendered inoperable.

Electricity: Sustained, long-term, loss of electricity will impact the ability of the remedial systems to operate and potentially cause exposure to onsite contaminants. This more of a concern with the SVE system not being able to control the vapor intrusion conditions for the neighboring properties. It may be necessary to have a back-up generator on standby for instances when there is long term power loss.

Spill/Contaminant Release: There are no known remaining items onsite that could result in a new release or spill onsite.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the PRR.

- Waste Generation will be limited to the regeneration of spent carbon from the SVE system. The carbon units will be used to the maximum extent possible before being regenerated on or offsite. If possible, they will be regenerated onsite to reduce travel requirements.
- Energy usage will be reduced to the extent possible by minimizing the use of the operation of the SVE system and potentially the SSDS as quickly as possible. If possible, a reduction in the fan and/or motor size will be evaluated to potentially reduce power usage for the systems.
- Emissions will be limited by the proper operation of the SSDS and SVE systems. SSDS emissions will be dispersed at roof top level and little to no impact on health or the environment. SVE emissions will be limited by the removal efficiency of the system. In addition, to the extent possible, the SVE operations will be reduced or terminated as quickly as possible.

Methods proposed to reduce energy consumption, resource usage, waste generation, water usage, etc., will be included in the PRR.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities. An outline of RSO report are provided in Appendix K.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.2. Remedial Systems

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be recycled onsite if possible or sent for recycling, as appropriate.

Remedial system types and associated parameters to be evaluated include, but are not limited to:

- Soil vapor extraction operations rates based on the removal of contaminants ;
- Activated carbon systems (spent carbon replacement and disposal or regeneration);
- SSDS operations

6.2.3 Building Operations

Buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

Components to be evaluated included, but are not limited to:

- Heating/cooling systems and temperature set-points;
- Building skin, insulation and building use and occupancy;
- Ventilation;
- Lighting and plug loads; and
- Grounds and property management.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

To the extent possible, onsite staff (building superintendent, janitorial staff, etc.) shall be trained to inspect, observe, and report on system operations so as to reduce the number of visits by offsite personnel. It is assumed that they will use public transportation to get to the site and/or live on the premises. Once the system has been in operation for approximately 6-12 months, a review will be done to optimize inspections by offsite personnel.

Other than testing and routine maintenance, the SSDS will only need to be addressed by offsite personnel should the system shut down.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix I – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix I. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 8 and summarized in the Periodic Review Report.

Table 8: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Monthly
Periodic Review Report	Annually, or as otherwise determined by the Department

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc.);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A PRR will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in Appendix A -Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances

highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS^{TM} database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:

  – The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;

  – The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;

  – Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;

  – Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and

  – Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.

  – The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the site during the calendar year, including information such as:

  – The number of days the system operated for the reporting period;

  – The average, high, and low flows per day;

  – The contaminant mass removed;

  – A description of breakdowns and/or repairs along with an explanation for any significant downtime;

  – A description of the resolution of performance problems;

  – Alarm conditions;

- Trends in equipment failure;
- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] "

At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

"For each institutional control identified for the site, I certify that all of the following statements are true:

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement.*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor,

pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative]"

- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3, upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in Appendix K. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO

recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

Hillmann Consulting LLC, 2013 Phase I Environmental Site Assessment

Equity Environmental Engineering LLC, 2016 Phase II Report

Equity Environmental Engineering LLC, 2016 IRMWP

Equity Environmental Engineering LLC, 2017 Construction Closure Report

NYSDEC 2017 Decision Document

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Legend

- Soil Boring (SB)
- Soil Vapor Sample Point (SG/SS)
- Groundwater Monitoring Well
- Property Boundary

0 10 20 40 60 80 Feet

1 inch = 38 feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

FIGURE 2
SITE MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	REV / DATE	DRAWING NUMBER
FU / 02272017		2015059-05

Legend

95 South 5th Street

N

FIGURE 3
TAX MAP

337 Berry St & 99-105 South 5th Street
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	REV / DATE	DRAWING NUMBER
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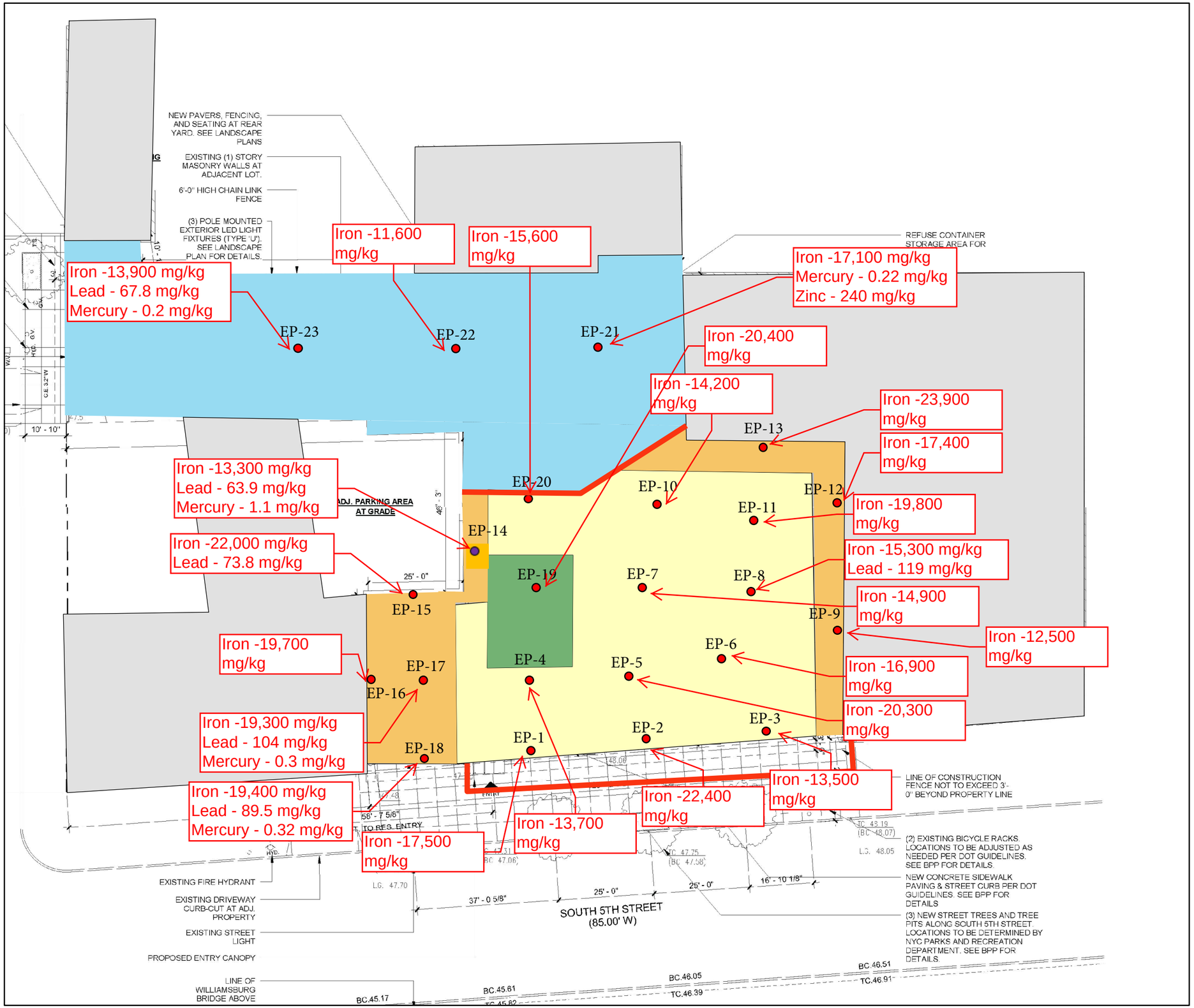


Legend

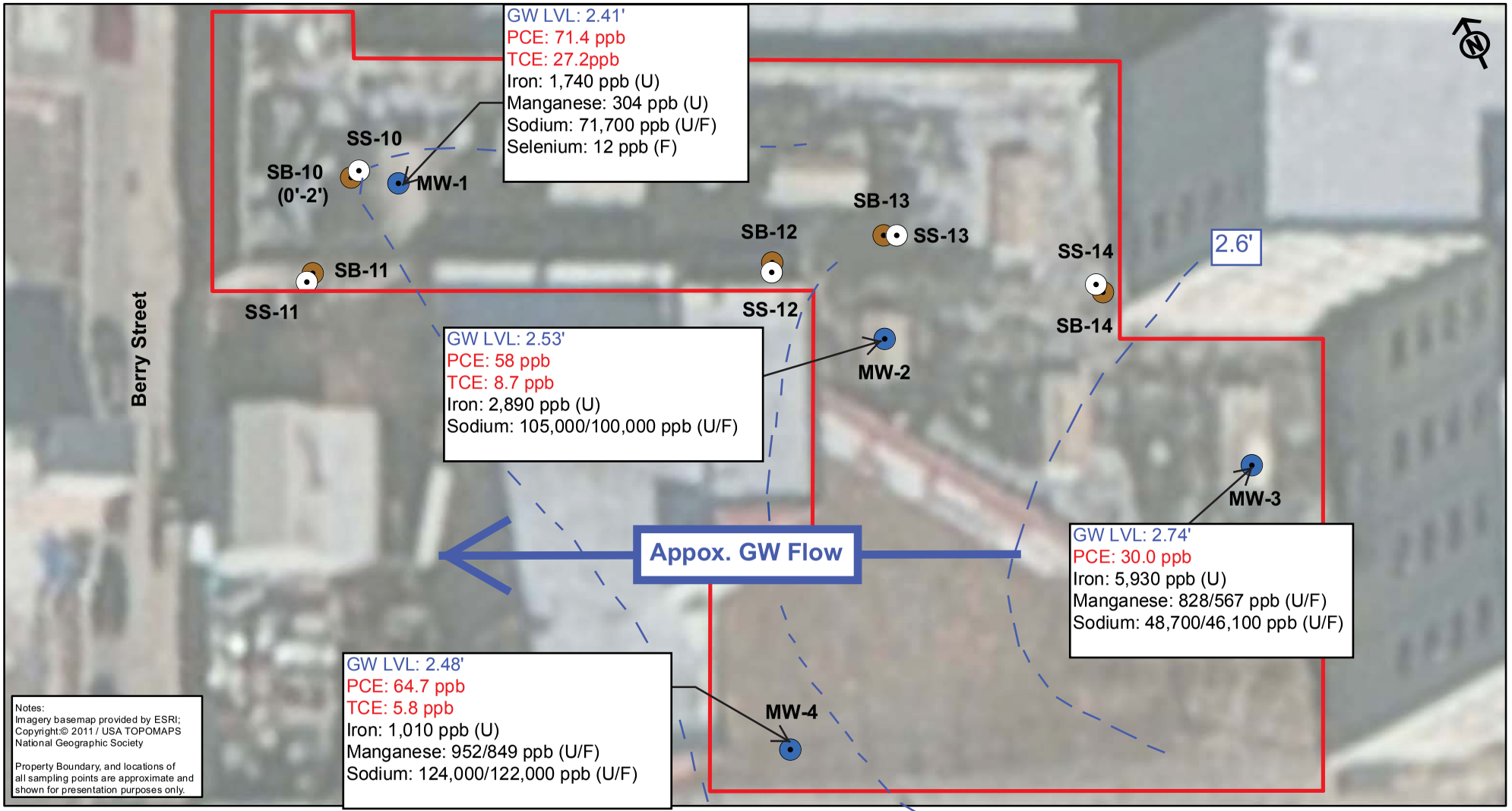
- Lined Sheeting
- End-Point Soil Sample Location
- Exceedance
- Adjoining Buildings
- Elevator Pit Excavation Area (17')
- Outer Excavation Area
- Inner Excavation Area (13')
- Parking Lot

FIGURE 4
REMAINING SOIL SAMPLE EXCEEDANCES

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

EDITED BY / DATE	REV / DATE	DRAWING NUMBER
JRV / 01112017		2015059-09



U: Unfiltered Sample
F: Filtered Sample

Legend

- Property Boundary
- Soil Vapor Sample Point (SS)
- Soil Boring
- Groundwater Monitoring Well

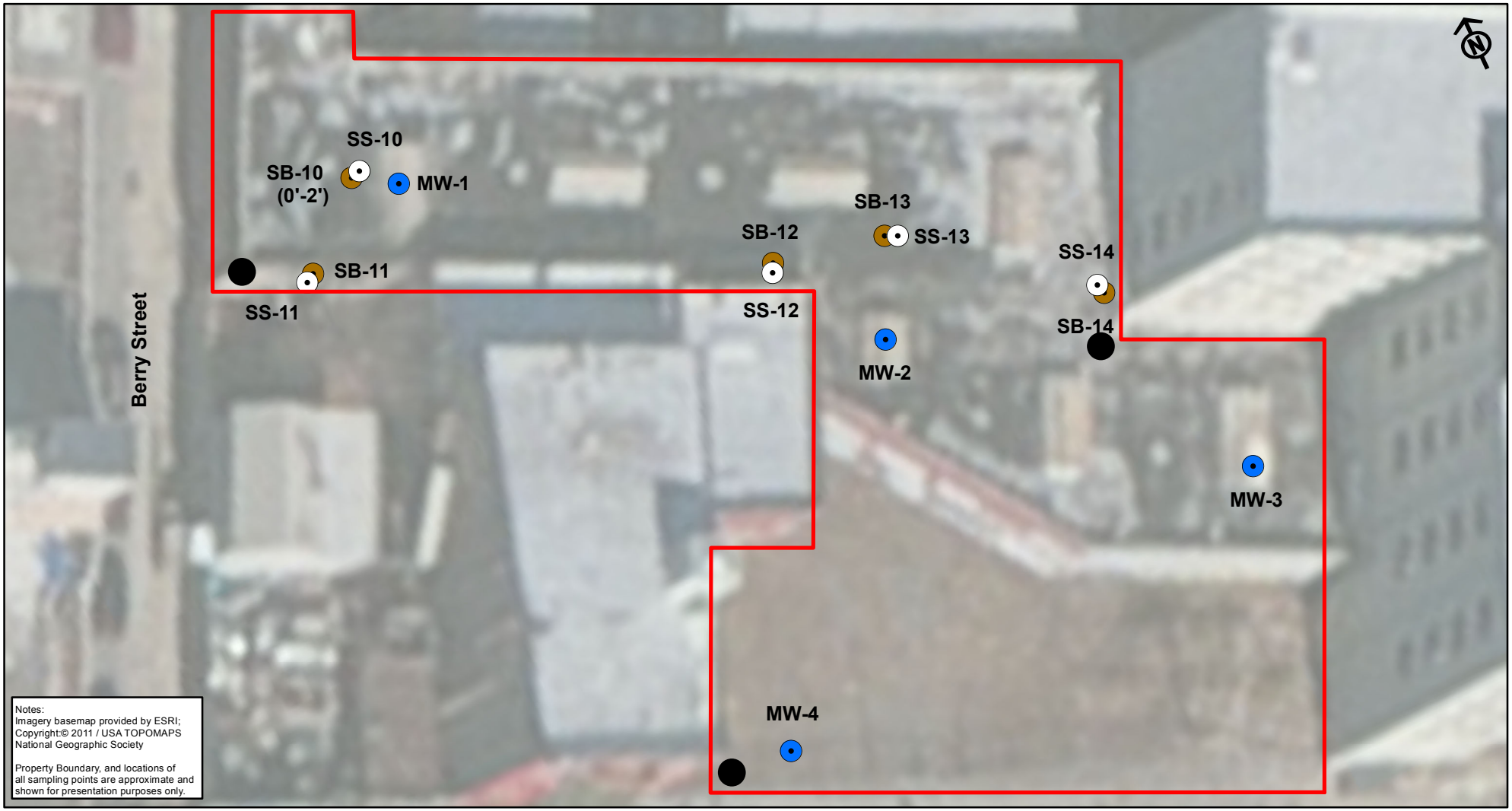
Note: Concentrations of Contaminants Above the GA Groundwater Standards

FIGURE 5
GROUNDWATER TAG MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	REV / DATE	DRAWING NUMBER
FU / 02272017	BJ/02-25-2015	2015059-07



Legend

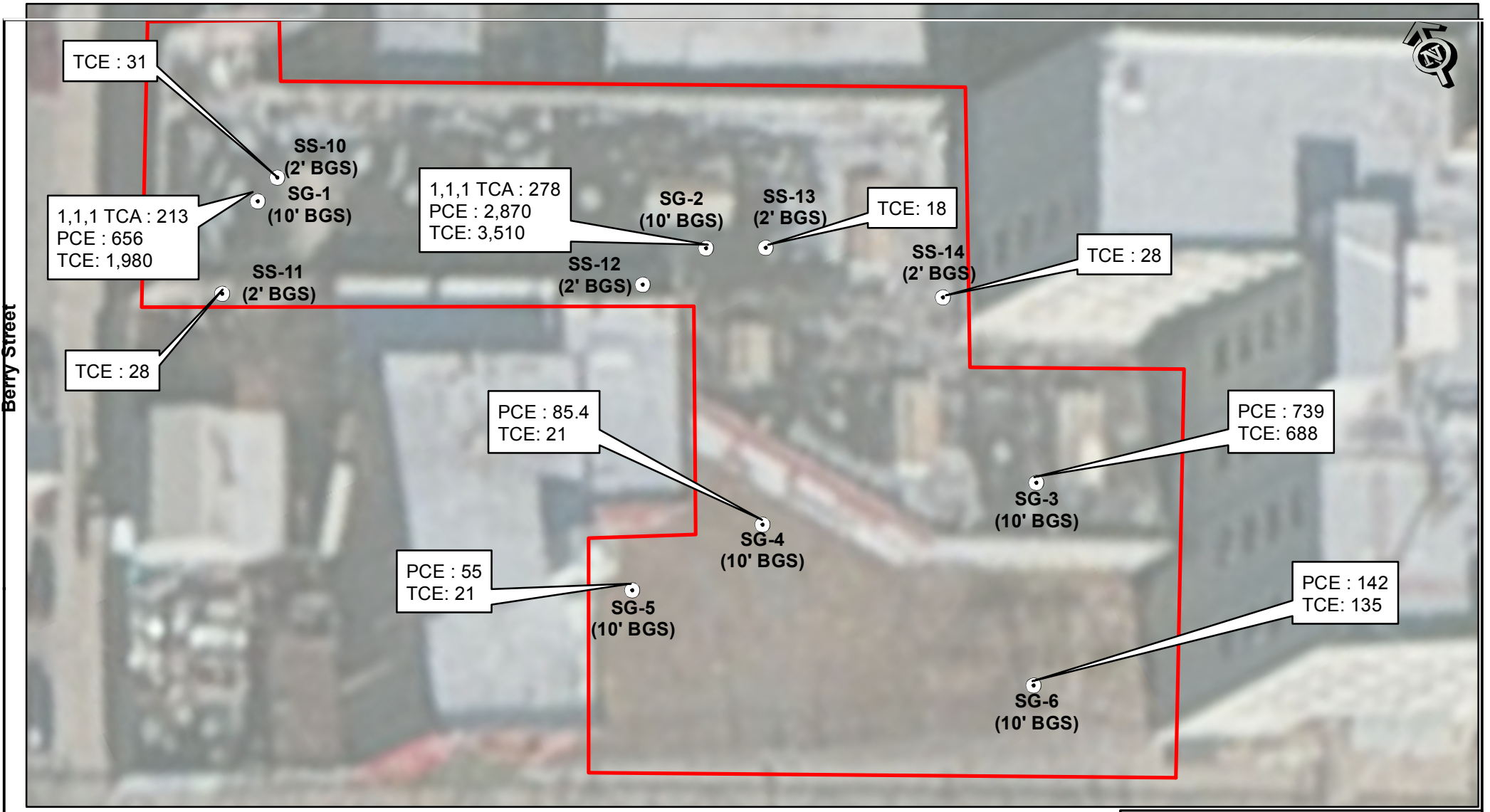
- Property Boundary
- Soil Vapor Sample Point (SS)
- Soil Boring
- Groundwater Monitoring Well
- Proposed Permanent Monitoring Wells

FIGURE 6
Proposed Monitoring Well Locations

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	REV / DATE	DRAWING NUMBER
NG / 10-28-15		2015059-04



SG 1-6 collected at 10-feet below ground surface
SG 10-14 collected at 2-feet below ground surface

Notes:
Imagery basemap provided by ESRI; Copyright:© 2011 / USA TOPOMAPS; National Geographic Society

Property Boundary, and locations of all sampling points are approximate and shown for presentation purposes only.

Legend

- Property Boundary
- Soil Vapor Sample Results (ug/m3)

1,1,1 TCA Trichloroethane (100.0 ug/m3)

TCE Trichloroethylene (2.0 ug/m3)

PCE Tetrachloroethylene (30.0 ug/m3)

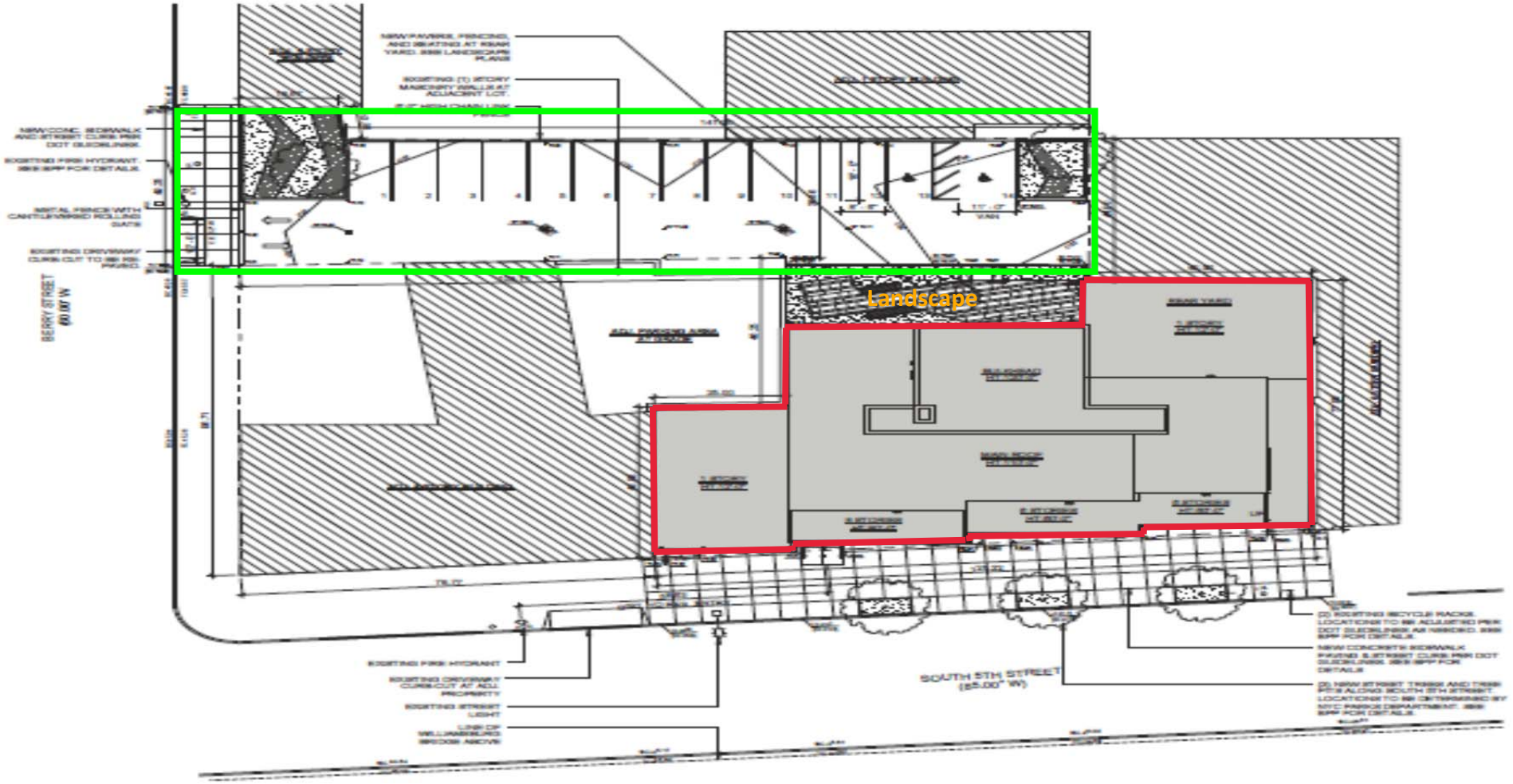
Note: Criteria Determined by MOER

FIGURE 7
SOIL VAPOR EXCEEDANCES

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	REV / DATE	DRAWING NUMBER
FU / 02272017		2015059-07



Note: Drawing is not drawn to scale. Original drawing copied from "Figure 5: Proposed Site Plan" created by Dattner Architects, D.P.C.

SSDS

SVE

FIGURE 8
Engineering Controls

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

Drawn By: NG/11-06-15 | Drawing Number: 2015059-03

Table 2
Remaining Soil Sample Exceedances

Client Sample ID:		NY SCO - Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	EP-1	EP-2	EP-3	EP-4	EP-5	EP-6	EP-7
Lab Sample ID:					JC34077-1	JC34077-2	JC34077-3	JC34077-4	JC34077-5	JC34077-6	JC34077-7
Date Sampled:					12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016
Matrix:					Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS Volatiles (SW846 8260C)											
Acetone	mg/kg	0.05	100	100	ND (0.0049)	ND (0.0046)	ND (0.0056)	ND (0.0054)	ND (0.0051)	ND (0.0046)	ND (0.0050)
Benzene	mg/kg	0.06	2.9	4.8	ND (0.00012)	ND (0.00011)	ND (0.00013)	ND (0.00013)	ND (0.00012)	ND (0.00011)	ND (0.00012)
Bromochloromethane	mg/kg	-	-	-	ND (0.00031)	ND (0.00030)	ND (0.00036)	ND (0.00034)	ND (0.00032)	ND (0.00029)	ND (0.00032)
Bromodichloromethane	mg/kg	-	-	-	ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00014)	ND (0.00015)
Bromoform	mg/kg	-	-	-	ND (0.00026)	ND (0.00025)	ND (0.00030)	ND (0.00029)	ND (0.00027)	ND (0.00024)	ND (0.00027)
Bromomethane	mg/kg	-	-	-	ND (0.00047)	ND (0.00045)	ND (0.00054)	ND (0.00052)	ND (0.00049)	ND (0.00045)	ND (0.00048)
2-Butanone (MEK)	mg/kg	0.12	100	100	ND (0.0017)	ND (0.0016)	ND (0.0020)	ND (0.0019)	ND (0.0018)	ND (0.0016)	ND (0.0018)
Carbon disulfide	mg/kg	-	100		ND (0.00017)	ND (0.00016)	ND (0.00019)	ND (0.00018)	ND (0.00017)	ND (0.00016)	ND (0.00017)
Carbon tetrachloride	mg/kg	0.76	1.4	2.4	ND (0.00016)	ND (0.00015)	ND (0.00019)	ND (0.00018)	ND (0.00017)	ND (0.00015)	ND (0.00017)
Chlorobenzene	mg/kg	1.1	100	100	ND (0.00016)	ND (0.00015)	ND (0.00018)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00016)
Chloroethane	mg/kg	-			ND (0.00042)	ND (0.00040)	ND (0.00048)	ND (0.00046)	ND (0.00043)	ND (0.00039)	ND (0.00043)
Chloroform	mg/kg	0.37	10	49	ND (0.00023)	ND (0.00022)	ND (0.00027)	ND (0.00026)	ND (0.00024)	ND (0.00022)	ND (0.00024)
Chloromethane	mg/kg	-	-	-	ND (0.00021)	ND (0.00020)	ND (0.00024)	ND (0.00023)	ND (0.00021)	ND (0.00019)	ND (0.00021)
Cyclohexane	mg/kg	-	-	-	ND (0.00053)	ND (0.00051)	ND (0.00061)	ND (0.00059)	ND (0.00055)	ND (0.00050)	ND (0.00054)
1,2-Dibromo-3-chloropropane	mg/kg	-	-	-	ND (0.00047)	ND (0.00045)	ND (0.00054)	ND (0.00052)	ND (0.00049)	ND (0.00044)	ND (0.00048)
Dibromochloromethane	mg/kg	-			ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00014)	ND (0.00015)
1,2-Dibromoethane	mg/kg	-	-	-	ND (0.00024)	ND (0.00022)	ND (0.00027)	ND (0.00026)	ND (0.00025)	ND (0.00022)	ND (0.00024)
1,2-Dichlorobenzene	mg/kg	1.1	100	100	ND (0.00017)	ND (0.00016)	ND (0.00019)	ND (0.00018)	ND (0.00017)	ND (0.00016)	ND (0.00017)
1,3-Dichlorobenzene	mg/kg	2.4	17	49	ND (0.00013)	ND (0.00013)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00013)	ND (0.00014)
1,4-Dichlorobenzene	mg/kg	1.8	9.8	13	ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00014)	ND (0.00015)
Dichlorodifluoromethane	mg/kg	-	-	-	ND (0.00053)	ND (0.00050)	ND (0.00061)	ND (0.00059)	ND (0.00055)	ND (0.00050)	ND (0.00054)
1,1-Dichloroethane	mg/kg	0.27	19	26	ND (0.00018)	ND (0.00017)	ND (0.00021)	ND (0.00020)	ND (0.00019)	ND (0.00017)	ND (0.00019)
1,2-Dichloroethane	mg/kg	0.02	2.3	3.1	ND (0.00017)	ND (0.00016)	ND (0.00019)	ND (0.00018)	ND (0.00017)	ND (0.00016)	ND (0.00017)
1,1-Dichloroethene	mg/kg	0.33	100	100	ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00014)	ND (0.00015)
cis-1,2-Dichloroethene	mg/kg	0.25	59	100	ND (0.00043)	ND (0.00041)	ND (0.00049)	ND (0.00047)	ND (0.00044)	ND (0.00040)	ND (0.00044)
trans-1,2-Dichloroethene	mg/kg	0.19	100	100	ND (0.00015)	ND (0.00015)	ND (0.00018)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00016)
1,2-Dichloropropane	mg/kg	-			ND (0.00030)	ND (0.00029)	ND (0.00035)	ND (0.00033)	ND (0.00031)	ND (0.00028)	ND (0.00031)
cis-1,3-Dichloropropene	mg/kg	-	-	-	ND (0.00019)	ND (0.00018)	ND (0.00022)	ND (0.00021)	ND (0.00020)	ND (0.00018)	ND (0.00020)
trans-1,3-Dichloropropene	mg/kg	-	-	-	ND (0.00022)	ND (0.00020)	ND (0.00025)	ND (0.00024)	ND (0.00022)	ND (0.00020)	ND (0.00022)
Ethylbenzene	mg/kg	1	30	41	ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00016)	ND (0.00015)	ND (0.00014)	ND (0.00015)
Freon 113	mg/kg	-	100		ND (0.00047)	ND (0.00045)	ND (0.00054)	ND (0.00052)	ND (0.00049)	ND (0.00044)	ND (0.00048)
2-Hexanone	mg/kg	-	-	-	ND (0.0014)	ND (0.0013)	ND (0.0016)	ND (0.0015)	ND (0.0014)	ND (0.0013)	ND (0.0014)
Isopropylbenzene	mg/kg	-	100		ND (0.00015)	ND (0.00014)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00014)	ND (0.00015)
Methyl Acetate	mg/kg	-	-	-	ND (0.0020)	ND (0.0019)	ND (0.0023)	ND (0.0022)	ND (0.0021)	ND (0.0019)	ND (0.0020)
Methylcyclohexane	mg/kg	-	-	-	ND (0.00049)	ND (0.00047)	ND (0.00056)	ND (0.00054)	ND (0.00051)	ND (0.00046)	ND (0.00050)
Methyl Tert Butyl Ether	mg/kg	0.93	62	100	ND (0.00026)	ND (0.00025)	ND (0.00030)	ND (0.00028)	ND (0.00027)	ND (0.00024)	ND (0.00026)
4-Methyl-2-pentanone(MIBK)	mg/kg	-			ND (0.00083)	ND (0.00079)	ND (0.00095)	ND (0.00091)	ND (0.00086)	ND (0.00078)	ND (0.00085)
Methylene chloride	mg/kg	0.05	51	100	0.0014 J	0.0019 J	0.0014 J	0.0016 J	0.0012 J	0.0017 J	0.0029 J
Styrene	mg/kg	-			ND (0.00014)	ND (0.00013)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00013)	ND (0.00014)
1,1,2,2-Tetrachloroethane	mg/kg	-	35		ND (0.00023)	ND (0.00022)	ND (0.00027)	ND (0.00026)	ND (0.00024)	ND (0.00022)	ND (0.00024)
Tetrachloroethene	mg/kg	1.3	5.5	19	ND (0.00027)	ND (0.00026)	ND (0.00031)	ND (0.00030)	ND (0.00028)	ND (0.00026)	ND (0.00028)
Toluene	mg/kg	0.7	100	100	ND (0.00012)	ND (0.00012)	ND (0.00014)	ND (0.00013)	ND (0.00013)	ND (0.00011)	ND (0.00012)
1,2,3-Trichlorobenzene	mg/kg	-			ND (0.00049)	ND (0.00046)	ND (0.00056)	ND (0.00054)	ND (0.00051)	ND (0.00046)	ND (0.00050)
1,2,4-Trichlorobenzene	mg/kg	-			ND (0.00049)	ND (0.00046)	ND (0.00056)	ND (0.00054)	ND (0.00051)	ND (0.00046)	ND (0.00050)
1,1,1-Trichloroethane	mg/kg	0.68	100	100	ND (0.00016)	ND (0.00015)	ND (0.00019)	ND (0.00018)	ND (0.00017)	ND (0.00015)	ND (0.00017)
1,1,2-Trichloroethane	mg/kg	-	-	-	ND (0.00032)	ND (0.00030)	ND (0.00036)	ND (0.00035)	ND (0.00033)	ND (0.00030)	ND (0.00032)
Trichloroethene	mg/kg	0.47	10	21	0.00025 J	0.00042 J	0.00023 J	0.00034 J	ND (0.00019)	0.00019 J	0.00089 J
Trichlorofluoromethane	mg/kg	-	-	-	ND (0.00061)	ND (0.00058)	ND (0.00070)	ND (0.00068)	ND (0.00064)	ND (0.00058)	ND (0.00063)
Vinyl chloride	mg/kg	0.02	0.21	0.9	ND (0.00020)	ND (0.00019)	ND (0.00023)	ND (0.00022)	ND (0.00020)	ND (0.00019)	ND (0.00020)
m,p-Xylene	mg/kg	0.26	100	100	ND (0.00021)	ND (0.00020)	ND (0.00024)	ND (0.00024)	ND (0.00022)	ND (0.00020)	ND (0.00022)
o-Xylene	mg/kg	0.26	100	100	ND (0.00020)	ND (0.00019)	ND (0.00023)	ND (0.00022)	ND (0.00020)	ND (0.00019)	ND (0.00020)
Xylene (total)	mg/kg	0.26	100	100	ND (0.00020)	ND (0.00019)	ND (0.00023)	ND (0.00022)	ND (0.00020)	ND (0.00019)	ND (0.00020)
GC/MS Semi-volatiles (SW846 8270D)											
2-Chlorophenol	mg/kg	-	100		ND (0.018)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.017)
4-Chloro-3-methyl phenol	mg/kg	-	-	-	ND (0.022)	ND (0.022)	ND (0.023)	ND (0.024)	ND (0.023)	ND (0.023)	ND (0.021)
2,4-Dichlorophenol	mg/kg	-	100		ND (0.031)	ND (0.030)	ND (0.033)	ND (0.033)	ND (0.032)	ND (0.032)	ND (0.030)
2,4-Dimethylphenol	mg/kg	-	-	-	ND (0.064)	ND (0.064)	ND (0.068)	ND (0.068)	ND (0.066)	ND (0.066)	ND (0.062)
2,4-Dinitrophenol	mg/kg	-	100		ND (0.14)	ND (0.13)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.13)
4,6-Dinitro-o-cresol	mg/kg	-	-	-	ND (0.039)	ND (0.038)	ND (0.041)	ND (0.041)	ND (0.040)	ND (0.040)	ND (0.037)
2-Methylphenol	mg/kg	0.33	100	100	ND (0.023)	ND (0.023)	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.024)	ND (0.022)
3&4-Methylphenol	mg/kg	-	-	-	ND (0.030)	ND (0.029)	ND (0.031)	ND (0.032)	ND (0.031)	ND (0.030)	ND (0.029)
2-Nitrophenol	mg/kg	-			ND (0.024)	ND (0.024)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.023)
4-Nitrophenol	mg/kg	-			ND (0.097)	ND (0.095)	ND (0.10)	ND (0.10)	ND (0.099)	ND (0.099)	ND (0.093)
Pentachlorophenol	mg/kg	0.8	2.4	6.7	ND (0.034)	ND (0.034)	ND (0.036)	ND (0.036)	ND (0.035)	ND (0.035)	ND (0.033)
Phenol	mg/kg	0.33	100	100	ND (0.019)	ND (0.019)	ND (0.020)	ND (0.020)	ND (0.019)	ND (0.019)	ND (0.018)
2,3,4,6-Tetrachlorophenol	mg/kg	-	-	-	ND (0.024)	ND (0.024)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.023)
2,4,5-Trichlorophenol	mg/kg	-	100		ND (0.027)	ND (0.027)	ND (0.029)	ND (0.029)	ND (0.028)	ND (0.028)	ND (0.026)
2,4,6-Trichlorophenol	mg/kg	-			ND (0.022)	ND (0.021)	ND (0.023)	ND (0.023)	ND (0.022)	ND (0.022)	ND (0.021)
Acenaphthene	mg/kg	20	100	100	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.012)
Acenaphthylene	mg/kg	100	100	100	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.020)	ND (0.019)	ND (0.019)	ND (0.018)
Acetophenone	mg/kg	-	-	-	ND (0.0078)	ND (0.0077)	ND (0.0082)	ND (0.0083)	ND (0.0080)	ND (0.0080)	ND (0.0075)
Anthracene	mg/kg	100	100	100	ND (0.022)	ND (0.022)	ND (0.023)	ND (0.024)	ND (0.023)	ND (0.023)	ND (0.021)
Atrazine	mg/kg	-	-	-	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.015)
Benzo(a)anthracene	mg/kg	1	1	1	ND (0.010)	ND (0.010)	ND (0.011)	0.0219 J	ND (0.011)	ND (0.010)	0.0203 J
Benzo(a)pyrene	mg/kg	1	1	1	ND (0.016)	ND (0.016)	ND (0.017)	0.0200 J	ND (0.017)	ND (0.017)	0.0164 J
Benzo(b)fluoranthene	mg/kg	1	1	1	ND (0.016)	ND (0.016)	ND (0.017)	0.0221 J	ND (0.016)	ND (0.016)	0.0224 J
Benzo(g,h,i)perylene	mg/kg	100	100	100	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.019)	ND (0.019)	ND (0.017)
Benzo(k)fluoranthene	mg/kg	0.8	1	3.9	ND (0.017)	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.017)	ND (0.017)	ND (0.016)
4-Bromophenyl phenyl ether	mg/kg	-	-	-	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.014)	ND (0.014)	ND (0.013)
Butyl benzyl phthalate	mg/kg	-	100		ND (0.0088)	ND (0.0087)	ND (0.0093)	ND (0.0094)	ND (0.0091)	ND (0.0090)	ND (0.0085)
1,1'-Biphenyl	mg/kg	-			ND (0.0050)	ND (0.0049)	ND (0.0052)	ND (0.0053)	ND (0.0051)	ND (0.0051)	ND (0.0048)
Benzaldehyde	mg/kg	-	-	-	ND (0.0090)	ND (0.0088)	ND (0.0095)	ND (0.0095)	ND (0.0092)	ND (0.0092)	ND (0.0086)
2-Chloronaphthalene	mg/kg	-	-	-	ND (0.0086)	ND (0.0085)	ND (0.0091)	ND (0.0091)	ND (0.0089)	ND (0.0088)	ND (0.0083)
4-Chloroaniline	mg/kg	-	100		ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)
Carbazole	mg/kg	-	-	-	ND (0.0052)	ND (0.0052)	ND (0.0055)	ND (0.0056)	ND (0.0054)	ND (0.0054)	ND (0.0051)
Caprolactam	mg/kg	-	-	-	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.014)
Chrysene	mg/kg	1	1	3.9	ND (0.011)	ND (0.011)	ND (0.012)	0.0180 J	ND (0.012)	ND (0.012)	0.0189 J
bis(2-Chloroethoxy)methane	mg/kg	-	-	-	ND (0.0077)	ND (0.0076)	ND (0.0082)	ND (0.0082)	ND (0.0080)	ND (0.0079)	ND (0.0075)
bis(2-Chloroethyl)ether	mg/kg	-	-	-	ND (0.016)	ND (0.015)	ND (0.016)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.015)
bis(2-Chloroisopropyl)ether	mg/kg	-	-	-	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)
4-Chlorophenyl phenyl ether	mg/kg	-	-	-	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.011)
2,4-Dinitrotoluene	mg/kg	-	-	-	ND (0.011)	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.011)	ND (0.011)
2,6-Dinitrotoluene	mg/kg	-	1.03		ND (0.018)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.019)	ND (0.019)	ND (0.018)
3,3'-Dichlorobenzidine	mg/kg	-	-	-	ND (0.030)	ND (0.030)	ND (0.032)	ND (0.032)	ND (0.031)	ND (0.031)	ND (0.029)
1,4-Dioxane	mg/kg	0.1	9.8	13	ND (0.024)	ND (0.024)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.025)	ND (0.023)
Dibenzo(a,h)anthracene	mg/kg	0.33	0.33	0.33	ND (0.016)	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.016)	ND (0.015)
Dibenzofuran	mg/kg	7	14	59	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.015)	ND (0.014)
Di-n-butyl phthalate	mg/kg	-	100		ND (0.0059)	ND (0.0058)	ND (0.0062)	ND (0.0063)	ND (0.0061)	ND (0.0060)	ND (0.0057)
Di-n-octyl phthalate	mg/kg	-	100		ND (0.0090)	ND (0.0089)	ND (0.0095)	ND (0.0096)	ND (0.0093)	ND (0.0092)	ND (0.0087)
Diethyl phthalate	mg/kg	-	100		ND (0.0077)	ND (0.0076)	ND (0.0081)	ND (0.0082)	ND (0.0079)	ND (0.0079)	ND (0.0074)
Dimethyl phthalate	mg/kg	-	100		ND (0.0064)	ND (0.0064)	ND (0.0068)	ND (0.0068)	ND (0.0066)	ND (0.0066)	ND (0.0062)
bis(2-Ethylhexyl)phthalate	mg/kg	-	50		ND (0.0085)	ND (0.0083)	ND (0.0089)	ND (0.0090)	ND (0.0087)	ND (0.0087)	ND (0.0082)
Fluoranthene	mg/kg	100	100	100	ND (0.016)	ND (0.016)	ND (0.017)	0.0320 J	ND (0.017)	ND (0.017)	0.0354
Fluorene	mg/kg	30	100	100	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.018)	ND (0.017)	ND (0.017)	ND (0.016)
Hexachlorobenzene	mg/kg	0.33	0.41	1.2	ND (0.0091)	ND (0.0090)	ND (0.0097)	ND (0.0097)	ND (0.0094)	ND (0.0094)	ND (0.0088)
Hexachlorobutadiene	mg/kg	-	-	-	ND (0.015)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.014)
Hexachlorocyclopentadiene	mg/kg	-			ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.014)
Hexachloroethane	mg/kg	-	-	-	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.017)
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	0.5	0.5	ND (0.017)	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.017)	ND (0.017)	ND (0.016)
Isophorone	mg/kg	-	100		ND (0.0077)	ND (0.0076)	ND (0.0082)	ND (0.0082)	ND (0.0080)	ND (0.0079)	ND (0.0075)
2-Methylnaphthalene	mg/kg	-	0.41		ND (0.0082)	ND (0.0081)	ND (0.0086)	ND (0.0087)	ND (0.0084)	ND (0.0084)	ND (0.0079)
2-Nitroaniline	mg/kg	-			ND (0.0085)	ND (0.0084)	ND (0.0090)	ND (0.0091)	ND (0.0088)	ND (0.0088)	ND (0.0082)
3-Nitroaniline	mg/kg	-			ND (0.0090)	ND (0.0089)	ND (0.0096)	ND (0.0096)	ND (0.0093)	ND (0.0093)	ND (0.0087)
4-Nitroaniline	mg/kg	-	-	-	ND (0.0094)	ND (0.0092)	ND (0.0099)	ND (0.0099)	ND (0.0096)	ND (0.0096)	ND (0.0090)

Client Sample ID:	EP-8	EP-9	EP-10	EP-11	EP-12	EP-13	DUP-01
Lab Sample ID:	JC34077-8	JC34077-9	JC34077-10	JC34077-11	JC34077-12	JC34077-13	JC34077-14
Date Sampled:	12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016	12/19/2016
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
GC/MS							
Acetone	ND (0.0054)	ND (0.0058)	ND (0.0063)	ND (0.0051)	ND (0.0051)	ND (0.0048)	ND (0.0052)
Benzene	ND (0.00013)	ND (0.00014)	ND (0.00015)	ND (0.00012)	ND (0.00012)	ND (0.00011)	ND (0.00012)
Bromochloromethane	ND (0.00035)	ND (0.00037)	ND (0.00040)	ND (0.00032)	ND (0.00032)	ND (0.00030)	ND (0.00033)
Bromodichloromethane	ND (0.00016)	ND (0.00018)	ND (0.00019)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00016)
Bromoform	ND (0.00029)	ND (0.00031)	ND (0.00033)	ND (0.00027)	ND (0.00027)	ND (0.00025)	ND (0.00028)
Bromomethane	ND (0.00052)	ND (0.00056)	ND (0.00061)	ND (0.00049)	ND (0.00049)	ND (0.00046)	ND (0.00050)
2-Butanone (MEK)	ND (0.0019)	ND (0.0020)	ND (0.0022)	ND (0.0018)	ND (0.0018)	ND (0.0017)	ND (0.0018)
Carbon disulfide	ND (0.00018)	ND (0.00020)	ND (0.00021)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00018)
Carbon tetrachloride	ND (0.00018)	ND (0.00019)	ND (0.00021)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)
Chlorobenzene	ND (0.00018)	ND (0.00019)	ND (0.00020)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00017)
Chloroethane	ND (0.00046)	ND (0.00050)	ND (0.00054)	ND (0.00044)	ND (0.00044)	ND (0.00041)	ND (0.00045)
Chloroform	ND (0.00026)	ND (0.00028)	ND (0.00030)	ND (0.00024)	ND (0.00024)	ND (0.00023)	ND (0.00025)
Chloromethane	ND (0.00023)	ND (0.00024)	ND (0.00026)	ND (0.00021)	ND (0.00021)	ND (0.00020)	ND (0.00022)
Cyclohexane	ND (0.00059)	ND (0.00063)	ND (0.00068)	ND (0.00055)	ND (0.00055)	ND (0.00052)	ND (0.00057)
1,2-Dibromo-3-chloropropane	ND (0.00052)	ND (0.00056)	ND (0.00061)	ND (0.00049)	ND (0.00049)	ND (0.00046)	ND (0.00050)
Dibromochloromethane	ND (0.00016)	ND (0.00017)	ND (0.00019)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00016)
1,2-Dibromoethane	ND (0.00026)	ND (0.00028)	ND (0.00030)	ND (0.00025)	ND (0.00025)	ND (0.00023)	ND (0.00025)
1,2-Dichlorobenzene	ND (0.00019)	ND (0.00020)	ND (0.00021)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00018)
1,3-Dichlorobenzene	ND (0.00015)	ND (0.00016)	ND (0.00017)	ND (0.00014)	ND (0.00014)	ND (0.00013)	ND (0.00014)
1,4-Dichlorobenzene	ND (0.00017)	ND (0.00018)	ND (0.00019)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)
Dichlorodifluoromethane	ND (0.00059)	ND (0.00063)	ND (0.00068)	ND (0.00055)	ND (0.00055)	ND (0.00052)	ND (0.00057)
1,1-Dichloroethane	ND (0.00020)	ND (0.00022)	ND (0.00023)	ND (0.00019)	ND (0.00019)	ND (0.00018)	ND (0.00019)
1,2-Dichloroethane	ND (0.00019)	ND (0.00020)	ND (0.00021)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00018)
1,1-Dichloroethene	ND (0.00017)	ND (0.00018)	ND (0.00019)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)
cis-1,2-Dichloroethene	ND (0.00047)	ND (0.00051)	ND (0.00055)	ND (0.00044)	ND (0.00044)	ND (0.00042)	ND (0.00045)
trans-1,2-Dichloroethene	ND (0.00017)	ND (0.00018)	ND (0.00020)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)
1,2-Dichloropropane	ND (0.00033)	ND (0.00036)	ND (0.00039)	ND (0.00031)	ND (0.00031)	ND (0.00029)	ND (0.00032)
cis-1,3-Dichloropropene	ND (0.00021)	ND (0.00023)	ND (0.00025)	ND (0.00020)	ND (0.00020)	ND (0.00019)	ND (0.00020)
trans-1,3-Dichloropropene	ND (0.00024)	ND (0.00026)	ND (0.00028)	ND (0.00022)	ND (0.00022)	ND (0.00021)	ND (0.00023)
Ethylbenzene	ND (0.00016)	ND (0.00017)	ND (0.00019)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00015)
Freon 113	ND (0.00052)	ND (0.00056)	ND (0.00061)	ND (0.00049)	ND (0.00049)	ND (0.00046)	ND (0.00050)
2-Hexanone	ND (0.0015)	ND (0.0016)	ND (0.0017)	ND (0.0014)	ND (0.0014)	ND (0.0013)	ND (0.0014)
Isopropylbenzene	ND (0.00017)	ND (0.00018)	ND (0.00019)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)
Methyl Acetate	ND (0.0022)	ND (0.0024)	ND (0.0025)	ND (0.0021)	ND (0.0021)	ND (0.0019)	ND (0.0021)
Methylcyclohexane	ND (0.00055)	ND (0.00059)	ND (0.00063)	ND (0.00051)	ND (0.00051)	ND (0.00048)	ND (0.00052)
Methyl Tert Butyl Ether	ND (0.00029)	ND (0.00031)	ND (0.00033)	ND (0.00027)	ND (0.00027)	ND (0.00025)	ND (0.00028)
4-Methyl-2-pentanone(MIBK)	ND (0.00092)	ND (0.00098)	ND (0.0011)	ND (0.00086)	ND (0.00086)	ND (0.00081)	ND (0.00088)
Methylene chloride	0.0015 J	0.0021 J	0.0019 J	0.0012 J	0.0017 J	0.0023 J	0.0021 J
Styrene	ND (0.00016)	ND (0.00017)	ND (0.00018)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00015)
1,1,2,2-Tetrachloroethane	ND (0.00026)	ND (0.00028)	ND (0.00030)	ND (0.00024)	ND (0.00024)	ND (0.00023)	ND (0.00025)
Tetrachloroethene	ND (0.00030)	ND (0.00033)	ND (0.00035)	ND (0.00029)	ND (0.00029)	ND (0.00027)	ND (0.00029)
Toluene	ND (0.00014)	ND (0.00015)	ND (0.00016)	ND (0.00013)	ND (0.00013)	ND (0.00012)	ND (0.00013)
1,2,3-Trichlorobenzene	ND (0.00054)	ND (0.00058)	ND (0.00063)	ND (0.00051)	ND (0.00051)	ND (0.00048)	ND (0.00052)
1,2,4-Trichlorobenzene	ND (0.00054)	ND (0.00058)	ND (0.00063)	ND (0.00051)	ND (0.00051)	ND (0.00048)	ND (0.00052)
1,1,1-Trichloroethane	ND (0.00018)	ND (0.00019)	ND (0.00021)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)
1,1,2-Trichloroethane	ND (0.00035)	ND (0.00037)	ND (0.00040)	ND (0.00033)	ND (0.00033)	ND (0.00031)	ND (0.00034)
Trichloroethene	ND (0.00021)	0.00025 J	0.00027 J	ND (0.00019)	0.00036 J	0.00076 J	0.00028 J
Trichlorofluoromethane	ND (0.00068)	ND (0.00073)	ND (0.00079)	ND (0.00064)	ND (0.00064)	ND (0.00060)	ND (0.00065)
Vinyl chloride	ND (0.00022)	ND (0.00023)	ND (0.00025)	ND (0.00021)	ND (0.00021)	ND (0.00019)	ND (0.00021)
m,p-Xylene	ND (0.00024)	ND (0.00025)	ND (0.00027)	ND (0.00022)	ND (0.00022)	ND (0.00021)	ND (0.00023)
o-Xylene	ND (0.00022)	ND (0.00023)	ND (0.00025)	ND (0.00021)	ND (0.00021)	ND (0.00019)	ND (0.00021)
Xylene (total)	ND (0.00022)	ND (0.00023)	ND (0.00025)	ND (0.00021)	ND (0.00021)	ND (0.00019)	ND (0.00021)
GC/MS Semi-							
2-Chlorophenol	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.020)	ND (0.017)	ND (0.019)	ND (0.020)
4-Chloro-3-methyl phenol	ND (0.022)	ND (0.022)	ND (0.024)	ND (0.024)	ND (0.021)	ND (0.023)	ND (0.025)
2,4-Dichlorophenol	ND (0.031)	ND (0.030)	ND (0.034)	ND (0.034)	ND (0.030)	ND (0.032)	ND (0.035)
2,4-Dimethylphenol	ND (0.065)	ND (0.064)	ND (0.070)	ND (0.070)	ND (0.062)	ND (0.067)	ND (0.072)
2,4-Dinitrophenol	ND (0.14)	ND (0.13)	ND (0.15)	ND (0.15)	ND (0.13)	ND (0.14)	ND (0.15)
4,6-Dinitro-o-cresol	ND (0.039)	ND (0.038)	ND (0.042)	ND (0.042)	ND (0.037)	ND (0.040)	ND (0.043)
2-Methylphenol	ND (0.023)	ND (0.023)	ND (0.025)	ND (0.025)	ND (0.022)	ND (0.024)	ND (0.026)
3&4-Methylphenol	ND (0.030)	ND (0.029)	ND (0.032)	ND (0.033)	ND (0.029)	ND (0.031)	ND (0.033)
2-Nitrophenol	ND (0.024)	ND (0.024)	ND (0.026)	ND (0.026)	ND (0.023)	ND (0.025)	ND (0.027)
4-Nitrophenol	ND (0.098)	ND (0.095)	ND (0.10)	ND (0.11)	ND (0.093)	ND (0.10)	ND (0.11)
Pentachlorophenol	ND (0.034)	ND (0.034)	ND (0.037)	ND (0.037)	ND (0.033)	ND (0.035)	ND (0.038)
Phenol	ND (0.019)	ND (0.019)	ND (0.021)	ND (0.021)	ND (0.018)	ND (0.020)	ND (0.021)
2,3,4,6-Tetrachlorophenol	ND (0.024)	ND (0.024)	ND (0.026)	ND (0.026)	ND (0.023)	ND (0.025)	ND (0.027)
2,4,5-Trichlorophenol	ND (0.027)	ND (0.027)	ND (0.029)	ND (0.030)	ND (0.026)	ND (0.028)	ND (0.030)
2,4,6-Trichlorophenol	ND (0.022)	ND (0.021)	ND (0.023)	ND (0.024)	ND (0.021)	ND (0.022)	ND (0.024)
Acenaphthene	ND (0.013)	ND (0.012)	ND (0.014)	ND (0.014)	ND (0.012)	ND (0.013)	ND (0.014)
Acenaphthylene	ND (0.019)	ND (0.018)	ND (0.020)	ND (0.020)	ND (0.018)	ND (0.019)	ND (0.021)
Acetophenone	ND (0.0079)	ND (0.0077)	ND (0.0084)	ND (0.0085)	ND (0.0075)	ND (0.0081)	ND (0.0087)
Anthracene	ND (0.022)	ND (0.022)	ND (0.024)	ND (0.024)	ND (0.021)	ND (0.023)	ND (0.025)
Atrazine	ND (0.016)	ND (0.015)	ND (0.017)	ND (0.017)	ND (0.015)	ND (0.016)	ND (0.017)
Benzo(a)anthracene	0.0637	ND (0.010)	0.0165 J	ND (0.011)	ND (0.0098)	ND (0.011)	ND (0.011)
Benzo(a)pyrene	0.057	ND (0.016)	ND (0.018)	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.018)
Benzo(b)fluoranthene	0.0834	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.015)	ND (0.017)	ND (0.018)
Benzo(g,h,i)perylene	0.047	ND (0.018)	ND (0.020)	ND (0.020)	ND (0.017)	ND (0.019)	ND (0.020)
Benzo(k)fluoranthene	0.0266 J	ND (0.017)	ND (0.018)	ND (0.018)	ND (0.016)	ND (0.018)	ND (0.019)
4-Bromophenyl phenyl ether	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.013)	ND (0.015)	ND (0.016)
Butyl benzyl phthalate	ND (0.0089)	ND (0.0087)	ND (0.0096)	ND (0.0096)	ND (0.0085)	ND (0.0092)	ND (0.0099)
1,1'-Biphenyl	ND (0.0050)	ND (0.0049)	ND (0.0054)	ND (0.0054)	ND (0.0048)	ND (0.0052)	ND (0.0056)
Benzaldehyde	ND (0.0091)	ND (0.0089)	ND (0.0097)	ND (0.0098)	ND (0.0086)	ND (0.0093)	ND (0.010)
2-Chloronaphthalene	ND (0.0087)	ND (0.0085)	ND (0.0093)	ND (0.0094)	ND (0.0083)	ND (0.0089)	ND (0.0097)
4-Chloroaniline	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.014)	ND (0.015)
Carbazole	ND (0.0053)	ND (0.0052)	ND (0.0057)	ND (0.0057)	ND (0.0050)	ND (0.0055)	ND (0.0059)
Caprolactam	ND (0.014)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.014)	ND (0.015)	ND (0.016)
Chrysene	0.0614	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.011)	ND (0.012)	ND (0.013)
bis(2-Chloroethoxy)methane	ND (0.0078)	ND (0.0077)	ND (0.0084)	ND (0.0085)	ND (0.0074)	ND (0.0080)	ND (0.0087)
bis(2-Chloroethyl)ether	ND (0.016)	ND (0.015)	ND (0.017)	ND (0.017)	ND (0.015)	ND (0.016)	ND (0.017)
bis(2-Chloroisopropyl)ether	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.012)	ND (0.013)	ND (0.015)
4-Chlorophenyl phenyl ether	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.013)	ND (0.011)	ND (0.012)	ND (0.013)
2,4-Dinitrotoluene	ND (0.011)	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.011)	ND (0.012)	ND (0.013)
2,6-Dinitrotoluene	ND (0.018)	ND (0.018)	ND (0.020)	ND (0.020)	ND (0.017)	ND (0.019)	ND (0.020)
3,3'-Dichlorobenzidine	ND (0.030)	ND (0.030)	ND (0.033)	ND (0.033)	ND (0.029)	ND (0.031)	ND (0.034)
1,4-Dioxane	ND (0.024)	ND (0.024)	ND (0.026)	ND (0.026)	ND (0.023)	ND (0.025)	ND (0.027)
Dibenzo(a,h)anthracene	ND (0.016)	ND (0.016)	ND (0.017)	ND (0.017)	ND (0.015)	ND (0.017)	ND (0.018)
Dibenzofuran	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.014)	ND (0.015)	ND (0.017)
Di-n-butyl phthalate	ND (0.0060)	ND (0.0058)	ND (0.0064)	ND (0.0064)	ND (0.0057)	ND (0.0061)	ND (0.0066)
Di-n-octyl phthalate	ND (0.0091)	ND (0.0089)	ND (0.0098)	ND (0.0098)	ND (0.0086)	ND (0.0094)	ND (0.010)
Diethyl phthalate	ND (0.0078)	ND (0.0076)	ND (0.0084)	ND (0.0084)	ND (0.0074)	ND (0.0080)	ND (0.0086)
Dimethyl phthalate	ND (0.0065)	ND (0.0064)	ND (0.0070)	ND (0.0070)	ND (0.0062)	ND (0.0067)	ND (0.0072)
bis(2-Ethylhexyl)phthalate	ND (0.0086)	ND (0.0084)	ND (0.0092)	ND (0.0093)	ND (0.0081)	ND (0.0088)	ND (0.0095)
Fluoranthene	0.116	ND (0.016)	0.0293 J	ND (0.018)	ND (0.015)	ND (0.017)	ND (0.018)
Fluorene	ND (0.017)	ND (0.016)	ND (0.018)	ND (0.018)	ND (0.016)	ND (0.017)	ND (0.019)
Hexachlorobenzene	ND (0.0092)	ND (0.0090)	ND (0.0099)	ND (0.010)	ND (0.0088)	ND (0.0095)	ND (0.010)
Hexachlorobutadiene	ND (0.015)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.014)	ND (0.015)	ND (0.016)
Hexachlorocyclopentadiene	ND (0.015)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.014)	ND (0.015)	ND (0.016)
Hexachloroethane	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.020)	ND (0.017)	ND (0.019)	ND (0.020)
Indeno(1,2,3-cd)pyrene	0.0413	ND (0.017)	ND (0.018)	ND (0.019)	ND (0.016)	ND (0.018)	ND (0.019)
Isophorone	ND (0.0078)	ND (0.0077)	ND (0.0084)	ND (0.0085)	ND (0.0074)	ND (0.0080)	ND (0.0087)
2-Methylnaphthalene	ND (0.0083)	ND (0.0081)	ND (0.0089)	ND (0.0089)	ND (0.0079)	ND (0.0085)	ND (0.0092)
2-Nitroaniline	ND (0.0086)	ND (0.0084)	ND (0.0093)	ND (0.0093)	ND (0.0082)	ND (0.0089)	ND (0.0096)
3-Nitroaniline	ND (0.0091)	ND (0.0089)	ND (0.0098)	ND (0.0099)	ND (0.0087)	ND (0.0094)	ND (0.010)
4-Nitroaniline	ND (0.0095)	ND (0.0093)	ND (0.010)	ND (0.010)	ND (0.0090)	ND (0.0097)	ND (0.011)

Client Sample ID:	EP-14	EP-15	EP-16	EP-17	EP-18	EP-19	EP-20	EP-21	EP-22	EP-23
Lab Sample ID:	JC34245-1	JC34245-2	JC34245-3	JC34245-4	JC34245-5	JC35210-1	JC35210-2	JC35210-3	JC35210-4	JC35210-5
Date Sampled:	12/21/2016	12/21/2016	12/21/2016	12/21/2016	12/21/2016	1/10/2017	1/10/2017	1/10/2017	1/10/2017	1/10/2017
Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Acetone	ND (0.0052)	ND (0.0050)	ND (0.0052)	ND (0.0049)	ND (0.0050)	ND (0.0052)	ND (0.0049)	ND (0.0051)	ND (0.0063)	ND (0.0053)
Benzene	ND (0.00013)	ND (0.00012)	ND (0.00012)	ND (0.00012)	ND (0.00012)	ND (0.00012)	ND (0.00012)	ND (0.00012)	ND (0.00015)	ND (0.00013)
Bromochloromethane	ND (0.00033)	ND (0.00032)	ND (0.00033)	ND (0.00031)	ND (0.00032)	ND (0.00033)	ND (0.00031)	ND (0.00032)	ND (0.00040)	ND (0.00034)
Bromodichloromethane	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00019)	ND (0.00016)
Bromoform	ND (0.00028)	ND (0.00026)	ND (0.00028)	ND (0.00026)	ND (0.00027)	ND (0.00028)	ND (0.00026)	ND (0.00027)	ND (0.00033)	ND (0.00028)
Bromomethane	ND (0.00051)	ND (0.00048)	ND (0.00050)	ND (0.00047)	ND (0.00049)	ND (0.00050)	ND (0.00048)	ND (0.00049)	ND (0.00061)	ND (0.00052)
2-Butanone (MEK)	ND (0.0018)	ND (0.0018)	ND (0.0018)	ND (0.0017)	ND (0.0018)	ND (0.0018)	ND (0.0017)	ND (0.0018)	ND (0.0022)	ND (0.0019)
Carbon disulfide	ND (0.00018)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00021)	ND (0.00018)
Carbon tetrachloride	ND (0.00017)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)	ND (0.00021)	ND (0.00018)
Chlorobenzene	ND (0.00017)	ND (0.00016)	ND (0.00017)	ND (0.00016)	ND (0.00016)	ND (0.00017)	ND (0.00016)	ND (0.00016)	ND (0.00020)	ND (0.00017)
Chloroethane	ND (0.00045)	ND (0.00043)	ND (0.00044)	ND (0.00042)	ND (0.00043)	ND (0.00045)	ND (0.00042)	ND (0.00044)	ND (0.00054)	ND (0.00046)
Chloroform	ND (0.00025)	ND (0.00024)	ND (0.00025)	ND (0.00023)	ND (0.00024)	ND (0.00025)	ND (0.00023)	ND (0.00024)	ND (0.00030)	ND (0.00025)
Chloromethane	ND (0.00022)	ND (0.00021)	ND (0.00022)	ND (0.00021)	ND (0.00021)	ND (0.00022)	ND (0.00021)	ND (0.00021)	ND (0.00026)	ND (0.00022)
Cyclohexane	ND (0.00057)	ND (0.00054)	ND (0.00056)	ND (0.00053)	ND (0.00055)	ND (0.00057)	ND (0.00053)	ND (0.00055)	ND (0.00068)	ND (0.00058)
1,2-Dibromo-3-chloropropane	ND (0.00051)	ND (0.00048)	ND (0.00050)	ND (0.00047)	ND (0.00049)	ND (0.00050)	ND (0.00047)	ND (0.00049)	ND (0.00061)	ND (0.00051)
Dibromochloromethane	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00019)	ND (0.00016)
1,2-Dibromoethane	ND (0.00025)	ND (0.00024)	ND (0.00025)	ND (0.00024)	ND (0.00024)	ND (0.00025)	ND (0.00024)	ND (0.00025)	ND (0.00030)	ND (0.00026)
1,2-Dichlorobenzene	ND (0.00018)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00021)	ND (0.00018)
1,3-Dichlorobenzene	ND (0.00014)	ND (0.00014)	ND (0.00014)	ND (0.00013)	ND (0.00014)	ND (0.00014)	ND (0.00013)	ND (0.00014)	ND (0.00017)	ND (0.00015)
1,4-Dichlorobenzene	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00019)	ND (0.00016)
Dichlorodifluoromethane	ND (0.00057)	ND (0.00054)	ND (0.00056)	ND (0.00053)	ND (0.00055)	ND (0.00057)	ND (0.00053)	ND (0.00055)	ND (0.00068)	ND (0.00058)
1,1-Dichloroethane	ND (0.00020)	ND (0.00019)	ND (0.00019)	ND (0.00018)	ND (0.00019)	ND (0.00019)	ND (0.00018)	ND (0.00019)	ND (0.00023)	ND (0.00020)
1,2-Dichloroethane	ND (0.00018)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00021)	ND (0.00018)
1,1-Dichloroethene	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00019)	ND (0.00016)
cis-1,2-Dichloroethene	ND (0.00046)	ND (0.00044)	ND (0.00045)	ND (0.00043)	ND (0.00044)	ND (0.00045)	ND (0.00043)	ND (0.00045)	ND (0.00055)	ND (0.00047)
trans-1,2-Dichloroethene	ND (0.00017)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00020)	ND (0.00017)
1,2-Dichloropropane	ND (0.00032)	ND (0.00031)	ND (0.00032)	ND (0.00030)	ND (0.00031)	ND (0.00032)	ND (0.00030)	ND (0.00031)	ND (0.00039)	ND (0.00033)
cis-1,3-Dichloropropene	ND (0.00021)	ND (0.00020)	ND (0.00020)	ND (0.00019)	ND (0.00020)	ND (0.00020)	ND (0.00019)	ND (0.00020)	ND (0.00025)	ND (0.00021)
trans-1,3-Dichloropropene	ND (0.00023)	ND (0.00022)	ND (0.00023)	ND (0.00022)	ND (0.00022)	ND (0.00023)	ND (0.00022)	ND (0.00022)	ND (0.00028)	ND (0.00023)
Ethylbenzene	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00019)	ND (0.00016)
Freon 113	ND (0.00051)	ND (0.00048)	ND (0.00050)	ND (0.00047)	ND (0.00049)	ND (0.00050)	ND (0.00047)	ND (0.00049)	ND (0.00061)	ND (0.00051)
2-Hexanone	ND (0.0015)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0017)	ND (0.0015)
Isopropylbenzene	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00015)	ND (0.00016)	ND (0.00015)	ND (0.00016)	ND (0.00019)	ND (0.00016)
Methyl Acetate	ND (0.0021)	ND (0.0020)	ND (0.0021)	ND (0.0020)	ND (0.0020)	ND (0.0021)	ND (0.0020)	ND (0.0021)	ND (0.0025)	ND (0.0022)
Methylcyclohexane	ND (0.00053)	ND (0.00050)	ND (0.00052)	ND (0.00049)	ND (0.00051)	ND (0.00052)	ND (0.00049)	ND (0.00051)	ND (0.00063)	ND (0.00054)
Methyl Tert Butyl Ether	ND (0.00028)	ND (0.00026)	ND (0.00027)	ND (0.00026)	ND (0.00027)	ND (0.00027)	ND (0.00026)	ND (0.00027)	ND (0.00033)	ND (0.00028)
4-Methyl-2-pentanone(MIBK)	ND (0.00089)	ND (0.00085)	ND (0.00088)	ND (0.00083)	ND (0.00085)	ND (0.00088)	ND (0.00083)	ND (0.00086)	ND (0.0011)	ND (0.00090)
Methylene chloride	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.00097)	ND (0.0010)	ND (0.0010)	ND (0.00098)	ND (0.0010)	ND (0.0013)	ND (0.0011)
Styrene	ND (0.00015)	ND (0.00014)	ND (0.00015)	ND (0.00014)	ND (0.00015)	ND (0.00015)	ND (0.00014)	ND (0.00015)	ND (0.00018)	ND (0.00015)
1,1,2,2-Tetrachloroethane	ND (0.00025)	ND (0.00024)	ND (0.00025)	ND (0.00023)	ND (0.00024)	ND (0.00025)	ND (0.00023)	ND (0.00024)	ND (0.00030)	ND (0.00025)
Tetrachloroethene	ND (0.00029)	ND (0.00028)	ND (0.00029)	ND (0.00027)	ND (0.00028)	ND (0.00029)	ND (0.00028)	ND (0.00029)	ND (0.00035)	ND (0.00030)
Toluene	ND (0.00013)	ND (0.00012)	ND (0.00013)	ND (0.00012)	ND (0.00013)	ND (0.00013)	ND (0.00012)	ND (0.00013)	ND (0.00016)	ND (0.00013)
1,2,3-Trichlorobenzene	ND (0.00052)	ND (0.00050)	ND (0.00052)	ND (0.00049)	ND (0.00050)	ND (0.00052)	ND (0.00049)	ND (0.00051)	ND (0.00063)	ND (0.00053)
1,2,4-Trichlorobenzene	ND (0.00052)	ND (0.00050)	ND (0.00052)	ND (0.00049)	ND (0.00050)	ND (0.00052)	ND (0.00049)	ND (0.00051)	ND (0.00063)	ND (0.00053)
1,1,1-Trichloroethane	ND (0.00018)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)	ND (0.00017)	ND (0.00016)	ND (0.00017)	ND (0.00021)	ND (0.00018)
1,1,2-Trichloroethane	ND (0.00034)	ND (0.00032)	ND (0.00033)	ND (0.00031)	ND (0.00032)	ND (0.00034)	ND (0.00032)	ND (0.00033)	ND (0.00040)	ND (0.00034)
Trichloroethene	ND (0.00020)	ND (0.00019)	0.00031 J	0.00028 J	ND (0.00019)	ND (0.00020)	ND (0.00019)	ND (0.00019)	ND (0.00024)	ND (0.00020)
Trichlorofluoromethane	ND (0.00066)	ND (0.00063)	ND (0.00065)	ND (0.00061)	ND (0.00063)	ND (0.00065)	ND (0.00062)	ND (0.00064)	ND (0.00079)	ND (0.00067)
Vinyl chloride	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00025)	ND (0.00021)
m,p-Xylene	ND (0.00023)	ND (0.00022)	ND (0.00023)	ND (0.00021)	ND (0.00022)	ND (0.00023)	ND (0.00021)	ND (0.00022)	ND (0.00027)	ND (0.00023)
o-Xylene	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00025)	ND (0.00021)
Xylene (total)	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00020)	ND (0.00021)	ND (0.00020)	ND (0.00021)	ND (0.00025)	ND (0.00021)
2-Chlorophenol	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.019)	ND (0.020)	ND (0.019)	ND (0.018)	ND (0.020)
4-Chloro-3-methyl phenol	ND (0.022)	ND (0.023)	ND (0.022)	ND (0.023)	ND (0.022)	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.023)	ND (0.025)
2,4-Dichlorophenol	ND (0.031)	ND (0.033)	ND (0.031)	ND (0.032)	ND (0.030)	ND (0.034)	ND (0.034)	ND (0.033)	ND (0.032)	ND (0.035)
2,4-Dimethylphenol	ND (0.064)	ND (0.068)	ND (0.064)	ND (0.067)	ND (0.064)	ND (0.070)	ND (0.071)	ND (0.070)	ND (0.066)	ND (0.072)
2,4-Dinitrophenol	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.14)	ND (0.13)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.14)	ND (0.15)
4,6-Dinitro-o-cresol	ND (0.039)	ND (0.041)	ND (0.038)	ND (0.040)	ND (0.038)	ND (0.042)	ND (0.043)	ND (0.042)	ND (0.040)	ND (0.044)
2-Methylphenol	ND (0.023)	ND (0.024)	ND (0.023)	ND (0.024)	ND (0.023)	ND (0.025)	ND (0.026)	ND (0.025)	ND (0.024)	ND (0.026)
3&4-Methylphenol	ND (0.030)	ND (0.031)	ND (0.029)	ND (0.031)	ND (0.029)	ND (0.032)	ND (0.033)	ND (0.032)	ND (0.030)	ND (0.033)
2-Nitrophenol	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.026)	ND (0.026)	ND (0.026)	ND (0.024)	ND (0.027)
4-Nitrophenol	ND (0.096)	ND (0.10)	ND (0.096)	ND (0.10)	ND (0.095)	ND (0.11)	ND (0.11)	ND (0.10)	ND (0.099)	ND (0.11)
Pentachlorophenol	ND (0.034)	ND (0.036)	ND (0.034)	ND (0.035)	ND (0.034)	ND (0.037)	ND (0.038)	ND (0.037)	ND (0.035)	ND (0.038)
Phenol	ND (0.019)	ND (0.020)	ND (0.019)	ND (0.020)	ND (0.019)	ND (0.021)	ND (0.021)	ND (0.020)	ND (0.019)	ND (0.021)
2,3,4,6-Tetrachlorophenol	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.026)	ND (0.027)	ND (0.026)	ND (0.025)	ND (0.027)
2,4,5-Trichlorophenol	ND (0.027)	ND (0.029)	ND (0.027)	ND (0.028)	ND (0.027)	ND (0.030)	ND (0.030)	ND (0.029)	ND (0.028)	ND (0.030)
2,4,6-Trichlorophenol	ND (0.021)	ND (0.023)	ND (0.021)	ND (0.022)	ND (0.021)	ND (0.024)	ND (0.024)	ND (0.023)	ND (0.022)	ND (0.024)
Acenaphthene	ND (0.012)	ND (0.013)	ND (0.012)	ND (0.013)	0.0171 J	ND (0.014)	ND (0.014)	ND (0.014)	0.0149 J	0.135
Acenaphthylene	ND (0.018)	ND (0.019)	ND (0.018)	0.0221 J	0.0245 J	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.019)	0.0912
Acetophenone	ND (0.0077)	ND (0.0082)	ND (0.0077)	ND (0.0080)	ND (0.0077)	ND (0.0085)	ND (0.0086)	ND (0.0084)	ND (0.0080)	ND (0.0087)
Anthracene	ND (0.022)	0.0473	ND (0.022)	0.0442	0.066	ND (0.024)	ND (0.025)	0.0257 J	0.0391	0.338
Atrazine	ND (0.015)	ND (0.016)	ND (0.015)	ND (0.016)	ND (0.015)	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.017)
Benzo(a)anthracene	0.0757	0.179	0.0734	0.192	0.225	ND (0.011)	0.0178 J	0.084	0.11	0.761
Benzo(a)pyrene	0.0695	0.147	0.0595	0.176	0.2	ND (0.018)	ND (0.018)	0.0819	0.107	0.74
Benzo(b)fluoranthene	0.0954	0.208	0.0872	0.229	0.261	ND (0.017)	ND (0.018)	0.0922	0.128	0.791
Benzo(g,h,i)perylene	0.043	0.0906	0.0364	0.0949	0.122	ND (0.020)	ND (0.020)	0.0501	0.0584	0.415
Benzo(k)fluoranthene	0.0287 J	0.0714	0.0253 J	0.0839	0.097	ND (0.018)	ND (0.019)	0.0363 J	0.0418	0.308
4-Bromophenyl phenyl ether	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.014)	ND (0.016)
Butyl benzyl phthalate	ND (0.0088)	ND (0.0093)	ND (0.0087)	ND (0.0091)	0.0544 J	ND (0.0096)	ND (0.0098)	ND (0.0096)	ND (0.0090)	0.0622 J
1,1'-Biphenyl	ND (0.0049)	ND (0.0052)	ND (0.0049)	ND (0.0051)	ND (0.0049)	ND (0.0054)	ND (0.0055)	ND (0.0054)	ND (0.0051)	0.0198 J
Benzaldehyde	ND (0.0089)	ND (0.0095)	ND (0.0089)	0.0161 J	0.0175 J	ND (0.0098)	ND (0.0099)	ND (0.0097)	ND (0.0092)	ND (0.010)
2-Chloronaphthalene	ND (0.0086)	ND (0.0091)	ND (0.0085)	ND (0.0089)	ND (0.0085)	ND (0.0094)	ND (0.0095)	ND (0.0093)	ND (0.0088)	ND (0.0097)
4-Chloroaniline	ND (0.013)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.015)
Carbazole	ND (0.0052)	0.0168 J	ND (0.0052)	0.0223 J	0.0371 J	ND (0.0057)	ND (0.0058)	ND (0.0057)	0.0183 J	0.136
Caprolactam	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.015)	ND (0.016)
Chrysene	0.0779	0.161	0.0741	0.192	0.212	ND (0.012)	ND (0.013)	0.0743	0.0959	0.642
bis(2-Chloroethoxy)methane	ND (0.0077)	ND (0.0082)	ND (0.0077)	ND (0.0080)	ND (0.0076)	ND (0.0084)	ND (0.0086)	ND (0.0084)	ND (0.0079)	ND (0.0087)
bis(2-Chloroethyl)ether	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.016)	ND (0.015)	ND (0.017)	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.018)
bis(2-Chloroisopropyl)ether	ND (0.013)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.015)
4-Chlorophenyl phenyl ether	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.012)	ND (0.013)
2,4-Dinitrotoluene	ND (0.011)	ND (0.012)	ND (0.011)	ND (0.012)	ND (0.011)	ND (0.012)	ND (0.012)	ND (0.012)	ND (0.011)	ND (0.013)
2,6-Dinitrotoluene	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.019)	ND (0.020)
3,3'-Dichlorobenzidine	ND (0.030)	ND (0.032)	ND (0.030)	ND (0.031)	ND (0.030)	ND (0.033)	ND (0.033)	ND (0.033)	ND (0.031)	ND (0.034)
1,4-Dioxane	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.025)	ND (0.024)	ND (0.026)	ND (0.026)	ND (0.026)	ND (0.024)	ND (0.027)
Dibenzo(a,h)anthracene	ND (0.016)	0.0218 J	ND (0.016)	0.0272 J	0.0304 J	ND (0.017)	ND (0.018)	ND (0.017)	0.0160 J	0.0993
Dibenzofuran	ND (0.015)	ND (0.016)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.015)	0.113
Di-n-butyl phthalate	ND (0.0059)	0.0536 J	ND (0.0058)	ND (0.0061)	ND (0.0058)	ND (0.0064)	ND (0.0065)	ND (0.0064)	ND (0.0060)	ND (0.0066)
Di-n-octyl phthalate	ND (0.0090)	ND (0.0095)	ND (0.0089)	ND (0.0093)	ND (0.0089)	ND (0.0098)	ND (0.010)	ND (0.0098)	ND (0.0092)	ND (0.010)
Diethyl phthalate	ND (0.0077)	ND (0.0081)	ND (0.0076)	ND (0.0080)	ND (0.0076)	ND (0.0084)	ND (0.0085)	ND (0.0083)	ND (0.0079)	ND (0.0087)
Dimethyl phthalate	ND (0.0064)	ND (0.0068)	ND (0.0064)	ND (0.0067)	ND (0.0064)	ND (0.0070)	ND (0.0071)	ND (0.0070)	ND (0.0066)	ND (0.0072)
bis(2-Ethylhexyl)phthalate	ND (0.0084)	0.0897	ND (0.0084)	ND (0.0087)	ND (0.0084)	ND (0.0092)	ND (0.0094)	0.0633 J	0.0596 J	0.0624 J
Fluoranthene	0.145	0.327	0.143	0.295	0.407	ND (0.018)	0.0302 J	0.162	0.232	1.69
Fluorene	ND (0.017)	ND (0.017)	ND (0.016)	ND (0.017)	0.0197 J	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.017)	0.12
Hexachlorobenzene	ND (0.0091)	ND (0.0096)	ND (0.0091)	ND (0.0095)	ND (0.0090)	ND (0.010)	ND (0.010)	ND (0.0099)	ND (0.0094)	ND (0.010)
Hexachlorobutadiene	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.016)
Hexachlorocyclopentadiene	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.016)	ND (0.016)	ND (0.016)	ND (0.015)	ND (0.016)
Hexachloroethane	ND (0.018)	ND (0.019)	ND (0.018)	ND (0.018)	ND (0.018)	ND (0.020)	ND (0.020)	ND (0.019)	ND (0.018)	ND (0.020)
Indeno(1,2,3-cd)pyrene	0.0505	0.0944	0.0441	0.109	0.134	ND (0.019)	ND (0.019)	0.057	0.07	0.478
Isophorone	ND (0.0077)	ND (0.0082)	ND (0.0077)	ND (0.0080)	ND (0.0076)	ND (0.0084)	ND (0.0086)	ND (0.0084)	ND (0.0079)	ND (0.0087)
2-Methylnaphthalene	ND (0.0081)	ND (0.0086)	ND (0.0081)	ND (0.0084)	ND (0.0081)	ND (0.0089)	ND (0.0091)	ND (0.0089)	ND (0.0084)	0.0649 J
2-Nitroaniline	ND (0.0085)	ND (0.0090)	ND (0.0085)	ND (0.0088)	ND (0.0084)	ND (0.0093)	ND (0.0095)	ND (0.0092)	ND (0.0087)	ND (0.0096)
3-Nitroaniline	ND (0.0090)	ND (0.0095)	ND (0.0090)	ND (0.0093)	ND (0.0089)	ND (0.0099)	ND (0.010)	ND (0.0098)	ND (0.0093)	ND (0.010)
4-Nitroaniline	ND (0.0093)	ND (0.0099)	ND (0.0093)	ND (0.0097)	ND (0.0092)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0096)	ND (0.011)

Table 2
Remaining Soil Sample Exceedances

Naphthalene	mg/kg	12	100	100	ND (0.010)	ND (0.010)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.010)	ND (0.0098)	ND (0.010)	ND (0.010)	ND (0.011)	ND (0.011)	ND (0.0098)	ND (0.011)	ND (0.011)	ND (0.010)	0.0158 J	ND (0.010)	0.0227 J	0.0192 J	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.010)	0.161
Nitrobenzene	mg/kg	-	3.7	15	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.013)	ND (0.015)	ND (0.016)	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.015)	ND (0.015)	ND (0.015)	ND (0.014)	ND (0.016)
N-Nitroso-di-n-propylamine	mg/kg	-	-	-	ND (0.010)	ND (0.010)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.012)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.010)	ND (0.011)	ND (0.012)	ND (0.011)	ND (0.011)	ND (0.012)
N-Nitrosodiphenylamine	mg/kg	-	-	-	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.013)	ND (0.013)	ND (0.014)	ND (0.014)	ND (0.013)	ND (0.014)	ND (0.015)	ND (0.013)	ND (0.014)	ND (0.013)	ND (0.014)	ND (0.013)	ND (0.014)	ND (0.015)	ND (0.014)	ND (0.014)	ND (0.015)
Phenanthrene	mg/kg	100	100	100	ND (0.012)	ND (0.012)	ND (0.013)	0.0182 J	ND (0.013)	ND (0.012)	0.0255 J	0.0635	ND (0.012)	0.0218 J	ND (0.013)	ND (0.012)	ND (0.013)	ND (0.014)	0.0867	0.196	0.101	0.194	0.297	ND (0.013)	0.0239 J	0.099	0.156	1.24
Pyrene	mg/kg	100	100	100	ND (0.012)	ND (0.011)	ND (0.012)	0.0368 J	ND (0.012)	ND (0.012)	0.0386	0.117	ND (0.011)	0.0252 J	ND (0.013)	ND (0.011)	ND (0.012)	ND (0.013)	0.141	0.322	0.142	0.343	0.458	ND (0.013)	0.0241 J	0.142	0.198	1.52
1,2,4,5-Tetrachlorobenzene	mg/kg	-	-	-	ND (0.0092)	ND (0.0091)	ND (0.0097)	ND (0.0098)	ND (0.0095)	ND (0.0094)	ND (0.0089)	ND (0.0093)	ND (0.0091)	ND (0.010)	ND (0.010)	ND (0.0088)	ND (0.0095)	ND (0.010)	ND (0.0091)	ND (0.0097)	ND (0.0091)	ND (0.0095)	ND (0.0091)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.0094)	ND (0.010)
Metals Analysis												**Metals**																
Aluminum	mg/kg	-			5960	6510	4980	6620	7340	6140	4500	5970	5920	5340	5580	4510	7660	6480	6350	6180	5260	7700	7790	5570	6780	8800	5640	6050
Antimony	mg/kg	-			<2.2	<2.2	<2.4	<2.3	<2.3	<2.2	<2.1	<2.3	<2.2	<2.4	<2.3	<2.1	<2.2	<2.5	<2.2	<2.2	<2.2	<2.3	<2.2	<1.6	<2.4	<2.5	<2.2	<1.6
Arsenic	mg/kg	13	16	16	<2.2	2.5	<2.4	2.3	2.3	<2.2	<2.1	3.3	2.2	<2.4	<2.3	2.1	2.3	<2.5	2.5	3	2.7	3.3	3.2	2.5	<2.4	2.9	2.3	2.4
Barium	mg/kg	350	350	400	47.9	47.1	35.2	44.1	54.7	42.8	37.9	77.1	36.7	38.4	48.9	33.3	47.7	45	155	56.4	42.9	83	80.3	42.5	46.7	66.8	44.2	57.4
Beryllium	mg/kg	7.2	14	72	<0.22	<0.22	<0.24	<0.23	<0.23	<0.22	<0.21	<0.23	<0.22	<0.24	<0.23	<0.21	<0.22	<0.25	0.37	0.46	0.42	0.46	0.49	0.47	0.45	0.82	0.29	0.35
Cadmium	mg/kg	2.5	2.5	4.3	<0.55	<0.55	<0.60	<0.56	<0.58	<0.54	<0.53	<0.57	<0.56	<0.61	<0.59	<0.52	<0.55	<0.61	<0.54	<0.56	<0.55	<0.56	<0.55	<0.40	<0.59	<0.62	<0.55	<0.41
Calcium	mg/kg	-			1050	1190	1420	1930	1290	1140	1420	3830	2610	1770	1320	853	738	1360	1980	2170	1960	3050	2830	1120	1630	3080	1740	2040
Chromium	mg/kg	-	-	-	19.6	18.1	13	16.4	21.9	16.4	12.7	14.4	14.3	16.5	18.8	13.9	20.6	19.6	14.6	17.3	14.9	18.8	22.4	17.1	17.4	28.9	14.4	16.4
Cobalt	mg/kg	-	30		8.2	8	<6.0	6.3	8	6.6	<5.3	<5.7	<5.6	<6.1	7.5	6.4	9.2	7.4	5.8	6.3	6.1	6.3	6.2	7	6.8	8	<5.5	5.6
Copper	mg/kg	50	270	270	22.6	22.6	11.9	15.2	24	18	13.8	16.1	12.4	11.8	20.8	11.6	26.5	21.8	14.2	17.8	15.3	19.5	20.3	24.9	17.3	42.9	14.5	16.1
Iron	mg/kg	-	2000		**17500**	**22400**	**13500**	**13700**	**20300**	**16900**	**14900**	**15300**	**12500**	**14200**	**19800**	**17400**	**23900**	**18400**	**13300**	**22000**	**19700**	**19400**	**19300**	**20400**	**15600**	**17100**	**11600**	**13900**
Lead	mg/kg	63	400	400	7.4	8.2	16.1	40.8	13.9	8.9	7.5	**119**	38	8.2	9.4	5.9	8.1	8.5	**63.9**	**73.8**	32.7	**104**	**89.5**	20	37.8	56.4	40.7	**67.8**
Magnesium	mg/kg	-	-	-	1960	1930	1920	2230	2440	1830	1630	2090	1870	2070	1760	1370	1830	1910	1950	1760	1750	2300	2570	1720	2120	3730	1880	2020
Manganese	mg/kg	1600	2000	2000	277	407	279	323	384	326	317	237	285	356	483	532	407	348	326	561	437	376	348	352	337	357	260	297
Mercury	mg/kg	0.18	0.81	0.81	0.037	<0.036	<0.036	0.042	<0.038	<0.035	<0.032	0.12	<0.033	<0.038	<0.037	<0.034	0.04	<0.039	**1.1**	0.17	0.09	**0.3**	**0.32**	<0.038	<0.039	**0.22**	0.15	**0.2**
Nickel	mg/kg	30	140	310	11.1	12.3	11.7	14.5	13.2	11.1	9	13.1	12.5	11.9	10.9	9.5	13.5	11.7	14.1	12.7	14.3	14	13.6	21.1	13.6	23.3	12.5	13.5
Potassium	mg/kg	-	-	-	1220	1460	<1200	1240	1880	1290	<1100	<1100	<1100	<1200	<1200	<1000	1560	1370	<1100	<1100	<1100	1170	1240	1130	1410	1450	<1100	1130
Selenium	mg/kg	3.9	36	180	<2.2	<2.2	<2.4	<2.3	<2.3	<2.2	<2.1	<2.3	<2.2	<2.4	<2.3	<2.1	<2.2	<2.5	<2.2	<2.2	<2.2	<2.3	<2.2	<1.6	<2.4	<2.5	<2.2	<1.6
Silver	mg/kg	2	36	180	<0.55	0.57	<0.60	<0.56	<0.58	<0.54	<0.53	<0.57	<0.56	<0.61	<0.59	<0.52	<0.55	<0.61	<0.54	<0.56	<0.55	<0.56	<0.55	<0.40	<0.59	<0.62	<0.55	<0.41
Sodium	mg/kg	-			<1100	<1100	<1200	<1100	<1200	<1100	<1100	<1100	<1100	<1200	<1200	<1000	<1100	<1200	<1100	<1100	<1100	<1100	<1100	<800	<1200	<1200	<1100	<820
Thallium	mg/kg	-			<1.1	<1.1	<1.2	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.0	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.1	<0.80	<1.2	<1.2	<1.1	<0.82
Vanadium	mg/kg	-	100		31.2	36	35.5	22.2	39.8	29.2	25.2	17.5	18.9	24.9	36.2	23.5	36.5	32.1	20	28.4	27.9	30	32.4	28.9	35.8	33.1	20.4	23.1
Zinc	mg/kg	109	2200	10000	34.2	33.8	33.4	44.2	34.5	28.7	25	92.9	63.1	23.8	31.9	24	38.3	31.3	54.1	54.3	45.1	77.3	75.9	53.8	46.3	**240**	37.3	48.5
General Chemistry																												
Solids, Percent	%	-	-	-	89.8	91.6	86.1	86.2	86.6	89.3	92.8	90.6	91.7	83.2	82.1	94.7	87.5	81.6	89.9	86.6	91.2	88.6	88.9	83.1	81	83.4	86.8	81.1

Footnotes:

* This compound in BS is outside in house QC limits bias high.

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. SGS Accutest assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

27 results exceeded regulatory criteria.

Hit

Exceed

Table 3
Remaining Groundwater Exceedances

Client Sample ID:		NY TOGS Class	MW-4	MW-4	MW-3	MW-3	FB-1	FB-1	MW-201	MW-201	MW-2	MW-2	MW-1	MW-1	TRIP BLANK
Lab Sample ID:		GA GW Standards (NYSDEC 6/2004)[1]	JC12052-1	JC12052-1F	JC12052-2	JC12052-2F	JC12052-3	JC12052-3F	JC12052-4	JC12052-4F	JC12052-5	JC12052-5F	JC12052-6	JC12052-6F	JC12052-7
Date Sampled:			5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016
Matrix:			Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Field Blank Water	Field Blank Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Trip Blank Water
GC/MS Volatiles (SW846 8260C)															
Acetone	ug/l	-	ND (3.3)	-	ND (3.3)	-	ND (3.3)	-	ND (3.3)	-	ND (3.3)	-	ND (0.93)	-	-
Benzene	ug/l	1	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (1.4)	-	-
Bromochloromethane	ug/l	5	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (1.3)	-	-
Bromodichloromethane	ug/l	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (1.3)	-	-
Bromoform	ug/l	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (1.1)	-	-
Bromomethane	ug/l	5	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.87)	-	-
2-Butanone (MEK)	ug/l	-	ND (5.6)	-	ND (5.6)	-	ND (5.6)	-	ND (5.6)	-	ND (5.6)	-	ND (0.82)	-	-
Carbon disulfide	ug/l	60	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.67)	-	-
Carbon tetrachloride	ug/l	5	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (1.4)	-	-
Chlorobenzene	ug/l	5	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (1.1)	-	-
Chloroethane	ug/l	5	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (1.4)	-	-
Chloroform	ug/l	7	3	-	4.2	-	ND (0.19)	-	2.1	-	2.3	-	ND (0.31)	-	-
Chloromethane	ug/l	5	ND (0.41)	-	ND (0.41)	-	ND (0.41)	-	ND (0.41)	-	ND (0.41)	-	ND (1.4)	-	-
Cyclohexane	ug/l	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (1.5)	-	-
1,2-Dibromo-3-chloropropane	ug/l	0.04	ND (0.99)	-	ND (0.99)	-	ND (0.99)	-	ND (0.99)	-	ND (0.99)	-	ND (1.4)	-	-
Dibromochloromethane	ug/l	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.29)	-	-
1,2-Dibromoethane	ug/l	0.0006	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.24)	-	-
1,2-Dichlorobenzene	ug/l	3	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.28)	-	-
1,3-Dichlorobenzene	ug/l	3	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.25)	-	-
1,4-Dichlorobenzene	ug/l	3	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.42)	-	-
Dichlorodifluoromethane	ug/l	5	ND (0.90)	-	ND (0.90)	-	ND (0.90)	-	ND (0.90)	-	ND (0.90)	-	ND (0.34)	-	-
1,1-Dichloroethane	ug/l	5	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.32)	-	-
1,2-Dichloroethane	ug/l	0.6	ND (0.18)	-	ND (0.18)	-	ND (0.18)	-	ND (0.18)	-	ND (0.18)	-	ND (0.33)	-	-
1,1-Dichloroethene	ug/l	5	ND (0.51)	-	1.1	-	ND (0.51)	-	0.57 J	-	0.53 J	-	ND (0.32)	-	-
cis-1,2-Dichloroethene	ug/l	5	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	0.51 J	-	0.61 J	-	ND (0.41)	-	-
trans-1,2-Dichloroethene	ug/l	5	ND (0.65)	-	ND (0.65)	-	ND (0.65)	-	ND (0.65)	-	ND (0.65)	-	ND (0.37)	-	-
1,2-Dichloropropane	ug/l	1	ND (0.39)	-	ND (0.39)	-	ND (0.39)	-	ND (0.39)	-	ND (0.39)	-	ND (0.37)	-	-
cis-1,3-Dichloropropene	ug/l	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.27)	-	-
trans-1,3-Dichloropropene	ug/l	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.26)	-	-
Ethylbenzene	ug/l	5	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.30)	-	-
Freon 113	ug/l	5	ND (0.52)	-	ND (0.52)	-	ND (0.52)	-	ND (0.52)	-	ND (0.52)	-	ND (0.23)	-	-
2-Hexanone	ug/l	-	ND (1.7)	-	ND (1.7)	-	ND (1.7)	-	ND (1.7)	-	ND (1.7)	-	ND (0.29)	-	-
Isopropylbenzene	ug/l	5	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.43)	-	-
Methyl Acetate	ug/l	-	ND (1.9)	-	ND (1.9)	-	ND (1.9)	-	ND (1.9)	-	ND (1.9)	-	ND (0.35)	-	-
Methylcyclohexane	ug/l	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.26)	-	-
Methyl Tert Butyl Ether	ug/l	10	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.34)	-	-
4-Methyl-2-pentanone(MIBK)	ug/l	-	ND (1.0)	-	ND (1.0)	-	ND (1.0)	-	ND (1.0)	-	ND (1.0)	-	ND (0.28)	-	-
Methylene chloride	ug/l	5	ND (0.73)	-	ND (0.73)	-	ND (0.73)	-	ND (0.73)	-	ND (0.73)	-	ND (0.27)	-	-
Styrene	ug/l	5	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.26)	-	-
1,1,2,2-Tetrachloroethane	ug/l	5	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.32)	-	-
Tetrachloroethene	ug/l	5	**64.7**	-	**30**	-	ND (0.40)	-	**57.2**	-	**58**	-	ND (0.53)	-	-
Toluene	ug/l	5	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.72)	-	-
1,2,3-Trichlorobenzene	ug/l	5	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.37)	-	-
1,2,4-Trichlorobenzene	ug/l	5	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.27)	-	-
1,1,1-Trichloroethane	ug/l	5	0.31 J	-	0.80 J	-	ND (0.25)	-	0.74 J	-	0.64 J	-	ND (0.79)	-	-
1,1,2-Trichloroethane	ug/l	1	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.29)	-	-
Trichloroethene	ug/l	5	**5.8**	-	3.4	-	ND (0.22)	-	**9.2**	-	**8.7**	-	ND (0.24)	-	-
Trichlorofluoromethane	ug/l	5	ND (0.43)	-	ND (0.43)	-	ND (0.43)	-	ND (0.43)	-	ND (0.43)	-	ND (0.31)	-	-
Vinyl chloride	ug/l	2	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	1.5 J	-	-
m,p-Xylene	ug/l	-	ND (0.38)	-	ND (0.38)	-	ND (0.38)	-	ND (0.38)	-	ND (0.38)	-	ND (0.23)	-	-
o-Xylene	ug/l	5	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.29)	-	-
Xylene (total)	ug/l	5	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.42)	-	-

Table 3
Remaining Groundwater Exceedances

Client Sample ID:		NY TOGS Class	MW-4	MW-4	MW-3	MW-3	FB-1	FB-1	MW-201	MW-201	MW-2	MW-2	MW-1	MW-1	TRIP BLANK
Lab Sample ID:		GA GW Standards	JC12052-1	JC12052-1F	JC12052-2	JC12052-2F	JC12052-3	JC12052-3F	JC12052-4	JC12052-4F	JC12052-5	JC12052-5F	JC12052-6	JC12052-6F	JC12052-7
Date Sampled:		(NYSDEC 6/2004)[1]	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016
Matrix:			Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Field Blank Water	Field Blank Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Trip Blank Water
												-	ND (0.36)	-	-
GC/MS Semi-volatiles (SW846 8270D)												-	ND (0.29)	-	-
												-	ND (0.22)	-	-
2-Chlorophenol	ug/l	-	ND (0.94)	-	ND (0.96)	-	ND (0.93)	-	ND (0.93)	-	ND (0.93)	-	ND (0.38)	-	-
4-Chloro-3-methyl phenol	ug/l	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (0.29)	-	-
2,4-Dichlorophenol	ug/l	1	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (0.29)	-	-
2,4-Dimethylphenol	ug/l	1	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (1.3)	-	ND (0.21)	-	-
2,4-Dinitrophenol	ug/l	1	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (0.24)	-	-
4,6-Dinitro-o-cresol	ug/l	-	ND (0.88)	-	ND (0.90)	-	ND (0.87)	-	ND (0.87)	-	ND (0.87)	-	ND (0.34)	-	-
2-Methylphenol	ug/l	-	ND (0.83)	-	ND (0.84)	-	ND (0.82)	-	ND (0.82)	-	ND (0.82)	-	ND (0.28)	-	-
3&4-Methylphenol	ug/l	-	ND (0.68)	-	ND (0.69)	-	ND (0.67)	-	ND (0.67)	-	ND (0.67)	-	ND (0.46)	-	-
2-Nitrophenol	ug/l	-	ND (1.4)	-	ND (1.5)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (0.31)	-	-
4-Nitrophenol	ug/l	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (1.1)	-	ND (0.29)	-	-
Pentachlorophenol	ug/l	1	ND (1.5)	-	ND (1.5)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (0.23)	-	-
Phenol	ug/l	1	ND (0.32)	-	ND (0.32)	-	ND (0.31)	-	ND (0.31)	-	ND (0.31)	-	ND (0.34)	-	-
2,3,4,6-Tetrachlorophenol	ug/l	-	ND (1.4)	-	ND (1.5)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (0.36)	-	-
2,4,5-Trichlorophenol	ug/l	-	ND (1.5)	-	ND (1.5)	-	ND (1.5)	-	ND (1.5)	-	ND (1.5)	-	ND (1.5)	-	-
2,4,6-Trichlorophenol	ug/l	-	ND (1.5)	-	ND (1.5)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	ND (1.4)	-	-
Acenaphthene	ug/l	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Acenaphthylene	ug/l	-	ND (0.24)	-	ND (0.25)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	-
Acetophenone	ug/l	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	-
Anthracene	ug/l	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	ND (0.25)	-	-
Atrazine	ug/l	7.5	ND (0.42)	-	ND (0.43)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	-
Benzaldehyde	ug/l	-	ND (0.34)	-	ND (0.35)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	-
Benzo(a)anthracene	ug/l	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	-
Benzo(a)pyrene	ug/l	ND	ND (0.34)	-	ND (0.34)	-	ND (0.33)	-	ND (0.33)	-	ND (0.33)	-	ND (0.33)	-	-
Benzo(b)fluoranthene	ug/l	-	ND (0.32)	-	ND (0.33)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	-
Benzo(g,h,i)perylene	ug/l	-	ND (0.41)	-	ND (0.42)	-	ND (0.41)	-	ND (0.41)	-	ND (0.41)	-	ND (0.41)	-	-
Benzo(k)fluoranthene	ug/l	-	ND (0.37)	-	ND (0.38)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	-
4-Bromophenyl phenyl ether	ug/l	-	ND (0.37)	-	ND (0.38)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	-
Butyl benzyl phthalate	ug/l	-	ND (0.27)	-	ND (0.28)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	-
1,1'-Biphenyl	ug/l	5	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	-
2-Chloronaphthalene	ug/l	-	ND (0.30)	-	ND (0.31)	-	ND (0.30)	-	ND (0.30)	-	ND (0.30)	-	ND (0.30)	-	-
4-Chloroaniline	ug/l	5	ND (0.23)	-	ND (0.24)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	-
Carbazole	ug/l	-	ND (0.30)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Caprolactam	ug/l	-	ND (0.43)	-	ND (0.44)	-	ND (0.43)	-	ND (0.43)	-	ND (0.43)	-	ND (0.43)	-	-
Chrysene	ug/l	-	ND (0.35)	-	ND (0.36)	-	ND (0.35)	-	ND (0.35)	-	ND (0.35)	-	ND (0.35)	-	-
bis(2-Chloroethoxy)methane	ug/l	5	ND (0.26)	-	ND (0.27)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	-
bis(2-Chloroethyl)ether	ug/l	1	ND (0.35)	-	ND (0.35)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	-
bis(2-Chloroisopropyl)ether	ug/l	5	ND (0.29)	-	ND (0.29)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	-
4-Chlorophenyl phenyl ether	ug/l	-	ND (0.27)	-	ND (0.28)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	-
2,4-Dinitrotoluene	ug/l	5	ND (0.27)	-	ND (0.27)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	ND (0.26)	-	-
2,6-Dinitrotoluene	ug/l	5	ND (0.33)	-	ND (0.33)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	ND (0.32)	-	-
3,3'-Dichlorobenzidine	ug/l	5	ND (0.54)	-	ND (0.55)	-	ND (0.53)	-	ND (0.53)	-	ND (0.53)	-	ND (0.53)	-	-
1,4-Dioxane	ug/l	-	ND (0.73)	-	ND (0.74)	-	ND (0.72)	-	ND (0.72)	-	ND (0.72)	-	ND (0.72)	-	-
Dibenzo(a,h)anthracene	ug/l	-	ND (0.37)	-	ND (0.38)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	ND (0.37)	-	-
Dibenzofuran	ug/l	-	ND (0.27)	-	ND (0.28)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	ND (0.27)	-	-
Di-n-butyl phthalate	ug/l	50	ND (0.79)	-	ND (0.81)	-	ND (0.79)	-	ND (0.79)	-	ND (0.79)	-	ND (0.79)	-	-
Di-n-octyl phthalate	ug/l	-	ND (0.29)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Diethyl phthalate	ug/l	-	ND (0.25)	-	ND (0.25)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	-
Dimethyl phthalate	ug/l	-	ND (0.32)	-	ND (0.32)	-	ND (0.31)	-	ND (0.31)	-	ND (0.31)	-	ND (0.31)	-	-
bis(2-Ethylhexyl)phthalate	ug/l	5	ND (0.78)	-	1.4 J	-	ND (0.77)	-	ND (0.77)	-	3.8	-	1.5 J	-	-
Fluoranthene	ug/l	-	ND (0.23)	-	ND (0.24)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	-
Fluorene	ug/l	-	ND (0.30)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Hexachlorobenzene	ug/l	0.04	ND (0.43)	-	ND (0.44)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	ND (0.42)	-	-
Hexachlorobutadiene	ug/l	0.5	ND (0.37)	-	ND (0.38)	-	ND (0.36)	-	ND (0.36)	-	ND (0.36)	-	ND (0.36)	-	-
Hexachlorocyclopentadiene	ug/l	5	ND (0.30)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Hexachloroethane	ug/l	5	ND (0.22)	-	ND (0.23)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	ND (0.22)	-	-
Indeno(1,2,3-cd)pyrene	ug/l	-	ND (0.39)	-	ND (0.40)	-	ND (0.38)	-	ND (0.38)	-	ND (0.38)	-	ND (0.38)	-	-
Isophorone	ug/l	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
2-Methylnaphthalene	ug/l	-	ND (0.29)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
2-Nitroaniline	ug/l	5	ND (0.21)	-	ND (0.22)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	ND (0.21)	-	-
3-Nitroaniline	ug/l	5	ND (0.24)	-	ND (0.25)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	ND (0.24)	-	-

Table 3
Remaining Groundwater Exceedances

Client Sample ID:		NY TOGS Class	MW-4	MW-4	MW-3	MW-3	FB-1	FB-1	MW-201	MW-201	MW-2	MW-2	MW-1	MW-1	TRIP BLANK
Lab Sample ID:		GA GW Standards (NYSDEC 6/2004)[1]	JC12052-1	JC12052-1F	JC12052-2	JC12052-2F	JC12052-3	JC12052-3F	JC12052-4	JC12052-4F	JC12052-5	JC12052-5F	JC12052-6	JC12052-6F	JC12052-7
Date Sampled:			5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016
Matrix:			Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Field Blank Water	Field Blank Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Trip Blank Water
4-Nitroaniline	ug/l	5	ND (0.35)	-	ND (0.35)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	-
Naphthalene	ug/l	-	ND (0.29)	-	ND (0.29)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	ND (0.28)	-	-
Nitrobenzene	ug/l	0.4	ND (0.47)	-	ND (0.48)	-	ND (0.46)	-	ND (0.46)	-	ND (0.46)	-	ND (0.46)	-	-
N-Nitroso-di-n-propylamine	ug/l	-	ND (0.32)	-	ND (0.32)	-	ND (0.31)	-	ND (0.31)	-	ND (0.31)	-	ND (0.31)	-	-
N-Nitrosodiphenylamine	ug/l	-	ND (0.30)	-	ND (0.30)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	ND (0.29)	-	-
Phenanthrene	ug/l	-	ND (0.23)	-	ND (0.24)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	ND (0.23)	-	-
Pyrene	ug/l	-	ND (0.34)	-	ND (0.35)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	ND (0.34)	-	-
1,2,4,5-Tetrachlorobenzene	ug/l	5	ND (0.37)	-	ND (0.37)	-	ND (0.36)	-	ND (0.36)	-	ND (0.36)	-	ND (0.36)	-	-
GC Semi-volatiles (SW846 8081B)															
Aldrin	ug/l	ND	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
alpha-BHC	ug/l	0.01	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	-
beta-BHC	ug/l	0.04	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	-
delta-BHC	ug/l	0.04	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	-
gamma-BHC (Lindane)	ug/l	0.05	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	ND (0.0028)	-	-
alpha-Chlordane	ug/l	-	ND (0.0025)	-	ND (0.0025)	-	ND (0.0025)	-	ND (0.0025)	-	ND (0.0025)	-	ND (0.0025)	-	-
gamma-Chlordane	ug/l	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
Dieldrin	ug/l	0.004	ND (0.0020)	-	ND (0.0020)	-	ND (0.0020)	-	ND (0.0020)	-	ND (0.0020)	-	ND (0.0020)	-	-
4,4'-DDD	ug/l	0.3	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
4,4'-DDE	ug/l	0.2	ND (0.0027)	-	ND (0.0027)	-	ND (0.0027)	-	ND (0.0027)	-	ND (0.0027)	-	ND (0.0027)	-	-
4,4'-DDT	ug/l	0.2	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
Endrin	ug/l	ND	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	-
Endosulfan sulfate	ug/l	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
Endrin aldehyde	ug/l	5	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	ND (0.0032)	-	-
Endrin ketone	ug/l	5	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	ND (0.0023)	-	-
Endosulfan-I	ug/l	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	-
Endosulfan-II	ug/l	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	-
Heptachlor	ug/l	0.04	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	ND (0.0029)	-	-
Heptachlor epoxide	ug/l	0.03	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	ND (0.0026)	-	-
Methoxychlor	ug/l	35	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	ND (0.0022)	-	-
Toxaphene	ug/l	0.06	ND (0.088)	-	ND (0.088)	-	ND (0.088)	-	ND (0.088)	-	ND (0.088)	-	ND (0.088)	-	-

Table 3

Remaining Groundwater Exceedances

Client Sample ID:		NY TOGS Class	MW-4	MW-4	MW-3	MW-3	FB-1	FB-1	MW-201	MW-201	MW-2	MW-2	MW-1	MW-1	TRIP BLANK
Lab Sample ID:		GA GW Standards	JC12052-1	JC12052-1F	JC12052-2	JC12052-2F	JC12052-3	JC12052-3F	JC12052-4	JC12052-4F	JC12052-5	JC12052-5F	JC12052-6	JC12052-6F	JC12052-7
Date Sampled:		(NYSDEC 6/2004)[1]	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016	5/1/2016
Matrix:			Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Field Blank Water	Field Blank Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Ground Water	Groundwater Filtered	Trip Blank Water
GC Semi-volatiles (SW846 8082A)															
Aroclor 1016	ug/l	0.09	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	-
Aroclor 1221	ug/l	0.09	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	ND (0.19)	-	-
Aroclor 1232	ug/l	0.09	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	ND (0.16)	-	-
Aroclor 1242	ug/l	0.09	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	ND (0.13)	-	-
Aroclor 1248	ug/l	0.09	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	ND (0.15)	-	-
Aroclor 1254	ug/l	0.09	ND (0.040)	-	ND (0.040)	-	ND (0.040)	-	ND (0.040)	-	ND (0.040)	-	ND (0.040)	-	-
Aroclor 1260	ug/l	0.09	ND (0.092)	-	ND (0.092)	-	ND (0.092)	-	ND (0.092)	-	ND (0.092)	-	ND (0.092)	-	-
Aroclor 1268	ug/l	0.09	ND (0.074)	-	ND (0.074)	-	ND (0.074)	-	ND (0.074)	-	ND (0.074)	-	ND (0.074)	-	-
Aroclor 1262	ug/l	0.09	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	ND (0.12)	-	-
Metals Analysis															
Aluminum	ug/l	-	622	<200	4120	<200	<200	<200	1000	<200	1480	<200	988	<200	-
Antimony	ug/l	3	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	-
Arsenic	ug/l	25	8	3.7	7.9	4.2	<3.0	<3.0	4.3	5.2	6.1	3.9	5.4	4.8	-
Barium	ug/l	1000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	-
Beryllium	ug/l	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Cadmium	ug/l	5	3.4	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-
Calcium	ug/l	-	78700	76200	53700	49800	<5000	<5000	66000	63400	64500	60800	71000	72000	-
Chromium	ug/l	50	<10	<10	13.6	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Cobalt	ug/l	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
Copper	ug/l	200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Iron	ug/l	300	**1010**	<100	**5930**	<100	<100	<100	**2340**	<100	**2890**	<100	**1740**	153	-
Lead	ug/l	25	5.5	<3.0	10.6	<3.0	<3.0	<3.0	6.2	<3.0	5.9	<3.0	4.4	<3.0	-
Magnesium	ug/l	-	25500	26100	12800	11900	<5000	<5000	21200	21700	21000	21100	27000	27600	-
Manganese	ug/l	300	**952**	**849**	**828**	**567**	<15	<15	239	136	234	130	**304**	290	-
Mercury	ug/l	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-
Nickel	ug/l	100	10.9	<10	12.8	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Potassium	ug/l	-	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	-
Selenium	ug/l	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**12**	-
Silver	ug/l	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Sodium	ug/l	20000	**124000**	**122000**	**48700**	**46100**	<10000	<10000	**105000**	**105000**	**105000**	**100000**	**71700**	**71700**	-
Thallium	ug/l	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-
Vanadium	ug/l	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-
Zinc	ug/l	-	<20	<20	23.8	<20	<20	<20	<20	<20	<20	<20	<20	<20	-

Regulatory limits listed in this document have been obtained from the latest version of the regulations cited and are used for advisory purposes only. Accutest assumes no responsibility for errors in regulatory documents or changes to criteria detailed in later versions of the referenced regulation. It is the responsibility of the user to verify these limits before using or reporting any data.

30 results exceeded regulatory criteria.

[1] NOTE: The above contain the following criteria that must be evaluated manually by the user:

Sum of Aldicarb and Methomyl at 0.35 ug/l.

Sum of Iron and Manganese at 500 ug/l.

Sum of Parathion and Methyl parathion at 1.5 ug/l.

Sum of Phenolic compounds (total phenols) at 1 ug/l.

Sum of Phenols, total chlorinated at 1 ug/l.

Sum of Phenols, total unchlorinated at 1 ug/l.

Principal organic contaminant at 5 ug/l defined as "any and every individual substance, whether listed in this Table or not, that is in one of the principal organic contaminant classes as defined in section 700.1 of this Title" unless listed elsewhere in this table.

Hit	Exceed

Table 4
Soil Vapor Exceedances

Client Sample ID:		SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SS-10	SS-11	SS-12	SS-13	SS-14
Lab Sample ID:		JC7272-4	JC7272-5	JC7272-6	JC7272-2	JC7272-1	JC7272-3	JC11091-1	JC11091-2	JC11091-5	JC11091-4	JC11091-3
Date Sampled:		10/28/2015	10/28/2015	10/28/2015	10/28/2015	10/28/2015	10/28/2015	12/17/2015	12/17/2015	12/17/2015	12/17/2015	12/17/2015
Matrix:		Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.	Soil Vapor Comp.
GC/MS Volatiles (TO-15) - ug/m3												
Acetone	ug/m3	54.6	109	31.6	110	208	54.6					
1,3-Butadiene	ug/m3	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)	ND (0.27)					
Benzene	ug/m3	2.1 J	2.7	2.6	5.1	24	4.8					
Bromodichloromethane	ug/m3	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)	ND (0.87)					
Bromoform	ug/m3	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)					
Bromomethane	ug/m3	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)					
Bromoethene	ug/m3	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)					
Benzyl Chloride	ug/m3	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)					
Carbon disulfide	ug/m3	ND (0.34)	3.4	2.2 J	10	12	1.6 J					
Chlorobenzene	ug/m3	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)					
Chloroethane	ug/m3	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)	ND (0.23)					
Chloroform	ug/m3	34	59.1	14	ND (0.59)	ND (0.59)	ND (0.59)					
Chloromethane	ug/m3	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)					
3-Chloropropene	ug/m3	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)	ND (0.34)					
2-Chlorotoluene	ug/m3	ND (0.67)	ND (0.67)	ND (0.67)	ND (0.67)	ND (0.67)	ND (0.67)					
Carbon tetrachloride	ug/m3	2.6 J	2.6 J	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)					
Cyclohexane	ug/m3	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)					
1,1-Dichloroethane	ug/m3	19	31	5.3	ND (0.49)	ND (0.49)	ND (0.49)					
1,1-Dichloroethylene	ug/m3	76.1	181	90.8	ND (0.44)	ND (0.44)	ND (0.44)					
1,2-Dibromoethane	ug/m3	ND (1.1)	5.3 J	ND (1.1)	43	ND (1.1)	ND (1.1)					
1,2-Dichloroethane	ug/m3	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)					
1,2-Dichloropropane	ug/m3	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)	ND (0.92)					
1,4-Dioxane	ug/m3	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)					
Dichlorodifluoromethane	ug/m3	3.2 J	3.4 J	4	4.2	3.1 J	5.4					
Dibromochloromethane	ug/m3	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)					
trans-1,2-Dichloroethylene	ug/m3	3.8	5.9	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)					
cis-1,2-Dichloroethylene	ug/m3	101	233	12	ND (0.39)	ND (0.39)	ND (0.39)					
cis-1,3-Dichloropropene	ug/m3	ND (0.64)	ND (0.64)	ND (0.64)	ND (0.64)	ND (0.64)	ND (0.64)					
m-Dichlorobenzene	ug/m3	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)					
o-Dichlorobenzene	ug/m3	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)					
p-Dichlorobenzene	ug/m3	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)					
trans-1,3-Dichloropropene	ug/m3	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)					
Ethanol	ug/m3	40.3	33.2	14	14	14	9.6					
Ethylbenzene	ug/m3	ND (0.83)	3.0 J	6.9	2.1 J	6.1	1.7 J					
Ethyl Acetate	ug/m3	ND (0.90)	ND (0.90)	ND (0.90)	3.4	ND (0.90)	ND (0.90)					
4-Ethyltoluene	ug/m3	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)					
Freon 113	ug/m3	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)					
Freon 114	ug/m3	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)					
Heptane	ug/m3	142	1.7 J	ND (0.49)	5.3	126	ND (0.49)					
Hexachlorobutadiene	ug/m3	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)					
Hexane	ug/m3	3.9	3.3	3.9	11	277	2.1 J					
2-Hexanone	ug/m3	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)	ND (0.74)					
Isopropyl Alcohol	ug/m3	3.9	3.2	1.7 J	2.7	2.9	1.8 J					
Methylene chloride	ug/m3	5.2	4.5	4.9	4.2	3.3	3.4					
Methyl ethyl ketone	ug/m3	3.8	20	2.9	16	49.3	5.6					
Methyl Isobutyl Ketone	ug/m3	ND (0.45)	6.6	2.1 J	ND (0.45)	ND (0.45)	ND (0.45)					
Methyl Tert Butyl Ether	ug/m3	ND (0.36)	ND (0.36)	8.7	ND (0.36)	ND (0.36)	ND (0.36)					
Methylmethacrylate	ug/m3	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)	ND (0.49)					
Propylene	ug/m3	6.4	22.3	22	129	3990	4					
Styrene	ug/m3	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)					
1,1,1-Trichloroethane	ug/m3	213	278	73.7	21	17	69.3	ND (0.71)	ND (0.71)	ND (0.71)	ND (0.71)	ND (0.71)
1,1,2,2-Tetrachloroethane	ug/m3	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)	ND (0.82)					
1,1,2-Trichloroethane	ug/m3	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)					
1,2,4-Trichlorobenzene	ug/m3	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)					
1,2,4-Trimethylbenzene	ug/m3	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)					
1,3,5-Trimethylbenzene	ug/m3	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)					
2,2,4-Trimethylpentane	ug/m3	377	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)	ND (0.40)					
Tertiary Butyl Alcohol	ug/m3	8.8	7.3	4.2	4.5	ND (0.61)	5.8					
Tetrachloroethylene	ug/m3	656	2870	739	85.4	55	142	ND (0.64)	7.3	5.8	0.75 J	2
Tetrahydrofuran	ug/m3	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)					
Toluene	ug/m3	5.3	4.5	4.9	7.2	31	4.9					
Trichloroethylene	ug/m3	1980	3510	688	21	21	135	31	23	3.4	18	28
Trichlorofluoromethane	ug/m3	27	57.9	116	39	9.6	33					
Vinyl chloride	ug/m3	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)	ND (0.33)					
Vinyl Acetate	ug/m3	ND (0.77)	ND (0.77)	ND (0.77)	ND (0.77)	ND (0.77)	ND (0.77)					
m,p-Xylene	ug/m3	3.0 J	11	26	6.1	13	4.3					
o-Xylene	ug/m3	ND (0.43)	4.3	15	2.5 J	4.8	1.7 J					
Xylenes (total)	ug/m3	3.0 J	15	41	8.7	18	6.1					

Shaded cells show detected compounds

APPENDIX A
ENVIRONMENTAL EASEMENT

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this _____ day of _____, 20__, between Owner(s) Williamsburg Bridgeview Apartments Housing Development Fund Corporation, (the "Grantor Fee Owner") having an office at 143 Huron Street, Brooklyn, New York 11222, County of Kings, State of New York, and LPC Development Group LLC, (the "Grantor Beneficial Owner"), having an office at 456 E. 173rd Street, Bronx, New York 10457, County of Bronx, State of New York (collectively, the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 105 S. 5th Street in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2443 Lot 6, being the same as that property conveyed to Grantor by deed dated June 29, 2016 and recorded in the City Register of the City of New York in Instrument No. 2016000239363. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.366 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 18, 2018 prepared by Neville V. Ramsay, L.L.S., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A;

WHEREAS, Grantor Beneficial Owner, is the owner of the beneficial interest in the

Controlled Property being the same as a portion of that beneficial interest conveyed to Grantor Beneficial Owner by means of a Declaration of Interest and Nominee Agreement dated June 29, 2016 and recorded in the City Register of the City of New York in Instrument No. 2016000239364; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224233-06-16, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the

Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property, excluding leasehold interests, a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property

shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by

the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement after applicable notice and cure period, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:
Site Number: C224233
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:
Site Control Section
Division of Environmental Remediation

NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor Fee Owner has caused this instrument to be signed in its name.

Williamsburg Bridgeview Apartments Housing Development Fund Corporation:

By: _____

Print Name: _____

Title:_____ Date:_____

Grantor Fee Owner's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the _____ day of _____, in the year 20__, before me, the undersigned, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

IN WITNESS WHEREOF, Grantor Beneficial Owner has caused this instrument to be signed in its name.

LPC Development Group LLC:

By: _____

Print Name: _____

Title:_____ Date:_____

Grantor Beneficial Owner's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the day of , in the year 20 , before me, the undersigned, personally appeared , personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Michael J. Ryan, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the _____ day of _____, in the year 20 __, before me, the undersigned, personally appeared Michael J. Ryan, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

SCHEDULE "A" PROPERTY DESCRIPTION

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at a point on the easterly side of Berry Street distant 90.00 feet southerly from the corner formed by the intersection of the easterly side of Berry Street with the southerly side of South 4th Street;

RUNNING THENCE easterly at 90 degrees to the easterly side of Berry Street and parallel to the southerly side of South 4th Street, 18.67 feet;

THENCE southwesterly forming an interior angle of 97 degrees 35 minutes 54 seconds with the last mentioned course 10.09 feet (survey), 10.15 feet (tax map);

THENCE southeasterly forming an interior angle of 262 degrees 24 minutes 06 seconds with the last mentioned course and parallel with the southerly side of South 4th Street, 141.00 feet;

THENCE southwesterly forming an interior angle of 90 degrees with the last mentioned course and parallel to the easterly side of Berry Street, 44.00 feet;

THENCE southeasterly forming an interior angle of 270 degrees 00 minutes 00 seconds with the last mentioned course and parallel with the southerly side of South 4th Street, 42.50 feet;

THENCE southwesterly forming an interior angle of 90 degrees with the last mentioned course and parallel to the easterly side of Berry Street, 77.89 feet (survey), 77.73 (tax map) to the northerly side of South 5th Street as widened;

THENCE northwesterly forming an interior angle of 93 degrees 57 minutes 02 seconds with the last mentioned course and along the northerly side of said South 5th Street 125.22 feet (survey) 125.21 (tax map);

THENCE northeasterly forming an interior angle of 85 degrees 58 minutes 55 seconds (computed) 46.88 feet (survey) 46.87 feet (tax map);

THENCE southeasterly forming an interior angle of 91 degrees 20 minutes 00 seconds with the last mentioned course, 25.00 feet;

THENCE northeasterly forming an interior angle of 268 degrees 40 minutes 04 seconds 46.25 feet (survey), 45.25 feet (tax map);

THENCE northwesterly forming an interior angle of 271 degrees 23 minutes 59 seconds with the last mentioned course 103.71 feet (survey), 103.67 (tax map) to the easterly side of Berry Street;

THENCE northeasterly along the easterly side of Berry Street forming an interior angle of 88 degrees 40 minutes 00 seconds with the last mentioned course 49.25 feet to the point or place of BEGINNING.

Containing an area of 15,941.13 square feet or 0.366 acres more or less.

RAMSAY LAND SURVEYING, P.C.

PROFESSIONAL LAND SURVEYOR-PLANNER

3024 RADCLIFF AVENUE
BRONX, NEW YORK 10469
FAX (718) 231-2067
Ph. (646) 773-4588
Ph. (917) 544-8174

NOTE: I

1). PREMISES SHOWN HEREON IS DESINATED ZONE "X" AND IS LOCATED IN AN AREA OF MINIMAL FLOOD HAZARD AREA AS PER (FIRM) -FLOOD INSURANCE RATE MAP NUMBER 3604970204F, COMMUNITY PANEL DATED SEPTEMBER 05, 2007.
2). AREA OF LOT No.06, BLOCK No.2443 .AREA= 0.366 ACRES OR 15,941.13 SQ. FT.
3). PARKING SPACES : 0

NOTE II:

THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE CURRENT "CODE OF PRACTICE" OF THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS (N.Y.S.A.P.L.S.) ALL CERTIFICATIONS HEREON SHALL RUN ONLY TO PERSONS, NAMED HEREON, FOR WHOM THIS SURVEY WAS PREPARED. AND, ON THEIR BEHALF TO ANY, TITLE COMPANY, GOVERNMENT AGENCY OR LENDING INSTITUTION NAMED HEREON. SAID CERTIFICATIONS ARE NOT TRANSFEREABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.
ANY ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PER SECTION 7209 SUB-SECTION 2.

ALL CERTIFICATIONS HEREON ARE VALID FOR THIS MAP AND COPIES THEREOF ONLY IF SAID MAP OR COPIES BEAR THE IMPRESSED SEAL OF THE SURVEYOR WHOSE SIGNATURE APPEARS HEREON

LEGAL DESCRIPTION

Tax Block 2443 Tax Lot No. 06

All that certain plot,piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

Beginning at a point on the easterly side of Berry Street distant 90.00 feet southerly from the corner formed by the intersection of the Easterly side of Berry Street with the Southerly side of South 4th. Street;

Running thence easterly at 90° to the Easterly side of Berry Street and parallel to the Southerly side of South 4th. Street, 18.67 feet;

THENCE Southwesterly forming an interior angle of 97°35'54" with the last mentioned course 10.09 feet (survey), 10.15 feet (tax map);

THENCE Southeasterly forming an interior angle of 262°24'06" with the last mentioned course and parallel with the Southerly side of South 4th. Street,141.00 feet;

THENCE Southwesterly forming an interior angle of 90° with the last mentioned course and parallel to the Easterly side of Berry Street 44.00 feet;

THENCE Southeasterly forming an interior angle of 270°00'00" with the last mentioned course and parallel with the Southerly side of South 4th. Street, 42.50 feet;

THENCE Southwesterly forming an interior angle of 90° with the last mentioned course and parallel to the Easterly side of Berry Street 77.89 feet (survey), 77.73 (tax map) to the Northerly side of South 5th. Street as widened;

THENCE Northwesterly forming an interior angle of 93°57'02" with the last mentioned course and along the Northerly side of said South 5th. Street 125.22 feet (SURV.), 125.21 TAX MAP;

THENCE Northeasterly forming an interior angle of 85°58'55" (computed) 46.88 feet (survey), 46.87 feet (tax map);

THENCE Southeasterly forming an interior angle of 91°20'00" with the last mentioned course 25.00 feet:

THENCE Northeasterly forming an interior angle of 268°40'04" 46.25 feet (survey), 45.25 feet (tax map);

THENCE Northwesterly forming an interior angle of 271°23'59" with the last mentioned course 103.71 feet (survey), 103.67 (tax map) to the Easterly side of Berry Street;

THENCE Northeasterly along the easterly side of Berry Street forming an interior angle of 88°40'00" with the last mentioned course 49.25 feet to the Point or Place of BEGINNING.

NOTE III:

1. The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at the time.
2. All elevations refer to NAVD– 1988 ADJUSTMENT
3. TC38.53 Denotes Top Of Curb elevations in feet.
   3a. 23.16 Denotes spot elevations in feet.
4. (BC123.5) Denotes Bottom of Curb elevations in feet.
5. Field data collected using conventional survey methods.
6. Equipment used: Topcon GPT 3000 Total Station .
   AREA OF BUILDING = 8257.29 SQ. FT.
7. The Underground Utility Information Shown Hereon Is One Of Several Possible Interpretations Of The Record Data As Provided By The Respective Utility Companies. The Location And Depth Of All Underground Utilities Must Be Verified With The Respective Utility Company Prior To Any Design And Construction Or Excavation.
8. There are no observable evidence of cemeteries , graves or burial grounds.on subject property.
9. SUBJECT PROPERTY: a). TAX LOT No.06 IN BLOCK No.2443 IS LOCATED IN M1-2/R6 ZONE ON ZONING MAP No.12D
   GENERAL HEIGHT AND SETBACK REGULATION:
   MAXIMUM STREET WALL HEIGHT = 60.0', MAXIMUM BUILDING HEIGHT = 110.0'
   NO FRONT AND SIDE YARDS REQUIRED FOR MIXED USE BUILDINGS
   FOR "RESIDENTIAL BUILDINGS [PORTIONS]" ANY AREA PROVIDED ALONG A SIDE LOT LINE MUST BE AT LEAST 8.0' ALONG SAID LOT LINE.
10. THERE ARE NO VISIBLE EASEMENTS OR RIGHT OF WAY OF WHICH THE UNDERSIGN HAS BEEN ADVISED.
11. THERE ARE OBSERVABLE, ABOVE GROUND ENCROACHMENTS (a) BY THE IMPROVEMENT ON THE SUBJECT PROPERTY UPON ADJOINING PROPERTIES, STREETS OR ALLEYS, OR (b) BY THE IMPROVEMENT ON THE ADJOINING PROPERTIES, STREETS OR ALLEYS, UPON THE SUBJECT POPERTY.
12. THE SUBJECT PROPERTY HAS ACCESS TO AND FROM A DULY DEDICATED AND ACCEPTED PUBLIC STREET OR HIGHWAY.
13. THE SUBJECT PROPERTY DOES NOT SERVE ANY ADJOINING PROPERTY FOR DRAINAGE, UTILITY OR INGRESS OR EGRESS.
14. THE RECORD DESCRIPTION OF THE SUBJECT PROPERTY DOES NOT FORM A MATHEMATICALLY CLOSED FIGURE. HOWEVER, THE INFORMATION SHOWN IN THE LEGAL DESCRIPTION ON THIS PLAT, WHICH WAS PRODUCED IN CONFORMANCE WITH ALTA STANDARDS, DOES FORM A MATHEMATICALLY CLOSED FIGURE.
15. THERE ARE NO OBSERVED EVIDENCE OR RECORD OF ANY PARTY WALL ADJACENT TO SUBJECT PROPERTY
16. THERE ARE NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
17. THERE IS NO PROPOSED CHANGES IN THE RIGHT OF WAY LINES. ADJACENT TO OR AFFECTING SUBJECT PROPERTY.
18. THERE IS NO EVIDENCE OF SUBJECT PROPERTY USED AS SOLID WASTE DUMP, SUMP OR LANDFILL
19. THERE IS NO EVIDENCE OF WATERCOURSE OR WETLANDS ON OR ACROSS SUBJECT PROPERTY
20. THERE IS NO IMPROVEMENTS WITHIN ANY OFFSITE EASEMENTS OR SERVITUDES BENEFITING THE SURVEYED PROPERTY THAT AE DISCLOSED IN ANY RECORD DOCUMENTS PROVIDED TO US.
    20(A). NOT APPLICABLE

JOB No.F15-174_ALT_BLY_06

NOTE IV:

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP) . A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT derweb@dec.ny.gov"

(EASEMENT LEGAL DESCRIPTION)

Tax Block 2443 Tax Lot No. 06

All that certain plot,piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

Beginning at a point on the easterly side of Berry Street distant 90.00 feet southerly from the corner formed by the intersection of the Easterly side of Berry Street with the Southerly side of South 4th. Street;

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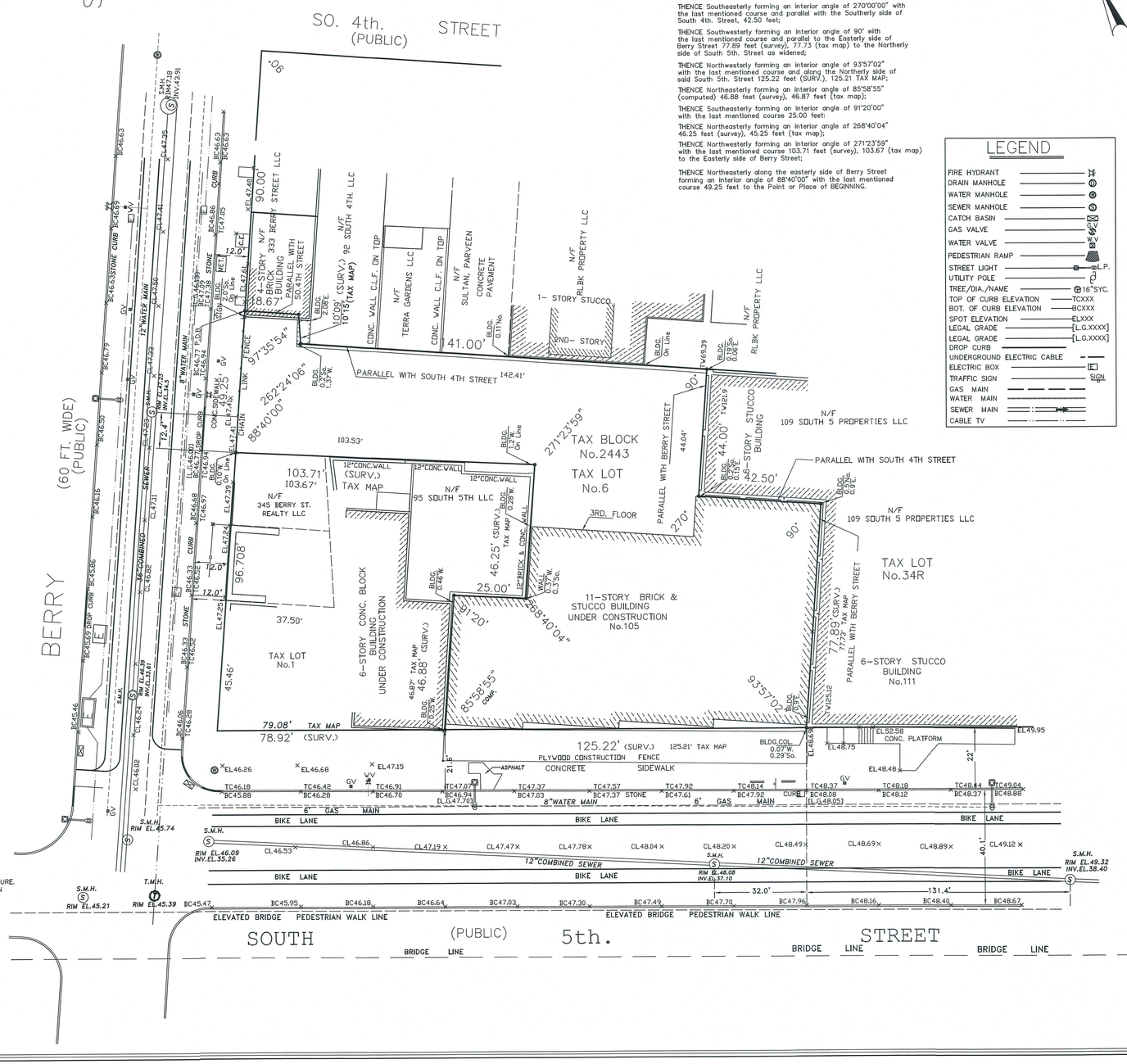
THENCE Northeasterly along the easterly side of Berry Street forming an interior angle of 88°40'00" with the last mentioned course 49.25 feet to the Point or Place of BEGINNING.



LEGEND

FIRE HYDRANT	
DRAIN MANHOLE	D
WATER MANHOLE	W
SEWER MANHOLE	S
CATCH BASIN	
GAS VALVE	GV
WATER VALVE	WV
PEDESTRIAN RAMP	
STREET LIGHT	L.P.
UTILITY POLE	
TREE/DIA./NAME	16"SYC.
TOP OF CURB ELEVATION	TCXXX
BOT. OF CURB ELEVATION	BCXXX
SPOT ELEVATION	ELXXX
LEGAL GRADE	[LG.XXXX]
LEGAL GRADE	[LG.XXXX]
DROP CURB	
UNDERGROUND ELECTRIC CABLE	
ELECTRIC BOX	E
TRAFFIC SIGN	SIGN
GAS MAIN	
WATER MAIN	
SEWER MAIN	
CABLE TV	

TITLE No.BTA72379

SURVEY OF PROPERTY DESIGNATED AS LOT No. 06 IN BLOCK No.2443 ON THE OFFICIAL TAX MAP OF THE BOROUGH OF BROOKLYN KINGS COUNTY, NEW YORK. ALSO KNOWN AS 105 SOUTH 5TH. STREET SITUATE IN THE BOROUGH OF BROOKLYN CITY AND STATE OF NEW YORK.

TITLE COMMITMENT NUMBER BTA 72379 ISSUED BY BENCHMARK TITLE AGENCY LLC REPESENTING STEWART TITLE INSURANCE COMPANY, EFFECTIVE MAY 20, 2016.

SURVEYORS CERTIFICATE

I HEREBY CERTIFY TO WILLIAMSBURG BRIDGEVIEW APARTMENTS HOUSING DEVELOPMENT FUND CORPORATION, LPC DEVELOPMENT GROUP LLC, NEW YORK CITY HOUSING DEVELOPMENT CORPORATION, ITS SUCCESSORS AND OR ASSIGNS, NEW YORK CITY RESIDENTIAL MORTGAGE INSURANCE CORPORATION, ITS SUCCESSORS AND OR ASSIGNS, AS THEIR INTERESTS MAY APPEAR, HUDSON HOUSING CAPITAL LLC, HUDSON SLP LLC, HUDSON LPC LLC, HUDSON HOUSING TAX CREDIT FUND XLI LP, THE CITY OF NEW YORK ACTING BY AND THROUGHITS DEPARTMENT OF HOUSING PRESERVATION AND DEVELOPMENT, CAPITAL ONE, NATIONAL ASSOCIATION, BENCHMARK TITLE AGENCY, LLC, AND STEWART TITLE INSURANCE COMPANY AND TO THEIR SUCCESSORS AND OR ASSIGNS, THAT:

" I MADE AN ON THE GROUND SURVEY PER RECORD DESCRIPTION OF THE LAND SHOWN HEREON LOCATED IN THE BOROUGH OF BROOKLYN, CITY AND STATE OF NEW YORK ON NOVEMBER 22, 2015; AND THAT IT AND THIS MAP WAS MADE IN ACCORDANCE WITH THE HUD SURVEY INSTRUCTIONS AND REPORT, HUD 92457M, AND THE REQUIREMENTS FOR AN ALTA/NSPS LAND TITLE SURVEY, AS DEFINED IN THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.

TO THE BEST OF MY KNOWLEDGE, BELIEF AND INFORMATION, EXCEPT AS SHOWN HEREON: THERE ARE NO ENCROACHMENTS EITHER WAY ACROSS PROPERTY LINES; TITLE LINES AND LINES OF ACTUAL POSSESSION ARE THE SAME; AND THE PREMISES ARE FREE OF ANY 100/500 YEAR RETURN FREQUENCY FLOOD HAZARD, AND SUCH FLOOD FREE CONDITIONS IS SHOWN ON THE FEDERAL FLOOD INSURANCE RATE MAP, COMMUNITY PANEL No.3604970204F."

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEM 2,3,4,6A,6B,7A,7B–1,8,9,10,10B,11A,11B,12,13,14,15,16,17 & 20 OF TABLE A

DESIGNATED AS LOT No.06 BLOCK No.2443 AS SHOWN ON THE OFFICIAL TAX MAP OF THE BOROUGH OF BROOKLYN, KINGS COUNTY, CITY AND STATE OF NEW YORK.

THE FIELD WORK WAS COMPLETED ON NOVEMBER 22, 2015
DATE MAP DRAFTED : DECEMBER 01, 2015
DATE MAP UPDATED : APRIL 22, 2016
DATE MAP UPDATED : MAY 02, 2016
DATE MAP UPDATED : JUNE 17,2016
DATE MAP UPDATED : MARCH 06, 2018
DATE MAP UPDATED : APRIL 27, 2018
DATE MAP UPDATED : JUNE 18,2018

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

Signature: _____ DATE: JUNE 18, 2018

NAME : NEVILLE V. RAMSAY LIC. No. 050294–1

STATE OF NEW YORK NEVILLE V. RAMSAY 050294 LICENSED LAND SURVEYOR

Registration No: 050294–1

APPENDIX B

SITE CONTCTS

Name	Phone/Email Address
Site Owner/Remedial Party - LPC Development Group LLC, Peter Procida	718-299-7000x211 pprocida@procidacompanies.com
QEP Robert Jackson, P.E.	973-527-7451 bob.jackson@equityenvironmental.com
NYSDEC Project Manager – Melissa Sweet	(518) 402-9614 melissa.sweet@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O'Connell	Jane O'Connell 718-482-4995 jane.oconnell@dec.ny.gov;
NYSDEC Site Control – Kelly Lewandowski	Kelly Lewandowski (518)402-9553 Kelly.lewandowski@dec.ny.gov,
Dean S. Sommer	518.438.9907 Ext. 236 DSommer@youngsommer.com

APPENDIX C
SOIL BORING LOGS

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-1**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/27/15	DRILLING CO.: Zebra	TOTAL DEPTH: 30.0'
COMPLETION DATE: 10/27/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0								0.0'- 1.0' **Concrete Slab-** Drill rig pushed through the concrete slab in garage to get to soil material.	
1	SB-1 (0'-2')	44"		0.0		X		1.0'-3.0' **Fill Material.** Loose, coarse sand with concrete, brick fragments, medium-large gravel, dry.	
2				0.0					
3	SB-1 (2'-4')			0.0		X		3.0'-5.0' **(SW-SM) Well graded sand with silt.** Medium dense, Strong Brown (7.5YR 4/6), coarse sand with silt, small gravel, dry.	
4				0.0					
5				0.0					
6		35"		0.0				5.0'-6.0' **(SW-SM) Well graded sand with silt.** Dense, Strong Brown (7.5YR 4/6), coarse sand with silt, small-medium gravel, dry.	
7				0.0				6.0'-6.5' **Red Brick & Large Rock**	
8				0.0				6.5'-7.0' **Rock**	
9				0.0				7.0'-10.0' **(SW-SM) Well graded sand with silt.** Loose, Light Brown (7.5YR 6/3), fine sand with silt, small gravel, dry.	
10				0.0					
11		55"		0.0				10.0'-15.0' **(SW-SM) Well graded sand with silt.** Dense, Brownish Yellow (10YR 6/8), coarse sand with silt, stiff, medium plasticity, dry.	
12				0.0					
13				0.0					
14				0.0					
15				0.0					
16		55"		0.0				15.0'-20.0' **(SW-SM) Well graded sand with silt.** Dense, Brownish Yellow (10YR 6/8), coarse sand with silt, stiff, medium plasticity, dry.	
17				0.0					
18				0.0					
19				0.0					
20				0.0					
								SB-1 Continued on Page 2 of 2	

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
Y = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-1 (Continued)**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/27/15	DRILLING CO.: Zebra	TOTAL DEPTH: 30.0'
COMPLETION DATE: 10/27/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
20				0.0				20.0'-22.0' **(SW-SM) Well graded sand with silt.** Dense, Brownish Yellow (10YR 6/8), coarse sand with silt and large gravel, stiff, medium plasticity, dry.	20
21				0.0					21
22				0.0					22
23		37"		0.0				22.0'-25.0 **(SW) Well graded sand** . Loose, Light Brown (7.5YR 6/3) coarse sand and small gravel, non-plastic, dry.	23
24				0.0					24
25				0.0					25
26				0.0				25.0'-30.0' **(SW) Well graded sand.** Loose, Light Brown (7.5YR 6/3) coarse sand and small gravel, non-plastic, dry.	26
27				0.0					27
28		58"		0.0					28
29				0.0					29
30				0.0					30
								Boring Stopped at 30.0' bgs	

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
Y = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-2**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/27/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 15.0'
COMPLETION DATE: 10/27/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'- 0.5' **Concrete-** Drill rig through the concrete floor in the garage area.	
1	SB-2 (0'-2')			0.0		X		0.5'-2.5' **Fill Material.** Loose, coarse sand with asphalt, concrete and gravel mix, dry	
2				0.0				2.5'-5.0' **(SW-SM) Well graded sand with silt.** Medium dense, Yellowish Red (5YR 4/6), fine sand with silt, non-plastic, dry.	
3	SB-2 (2'-4')	35"		0.0		X			
4				0.0					
5				0.0					
6				0.0				5.0'-10.0' **(SW-SM) Well graded sand with silt.** Very dense, Yellowish Red (5YR 4/6), fine sand with silt, very stiff, low plasticity, dry.	
7				0.0					
8		41"		0.0					
9				0.0					
10				0.0					
11				0.0				10.0'-15.0' **(SW-SM) Well graded sand with silt.** Very dense, Yellowish Red (5YR 4/6), fine sand with silt, very stiff, low plasticity, dry.	
12				0.0					
13		42"		0.0					
14				0.0					
15				0.0					
								Boring Stopped at 15.0' bgs	

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-3**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/27/15	DRILLING CO.: Zebra	TOTAL DEPTH: 15.0'
COMPLETION DATE: 10/27/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'- 1.0' **Fill Material.** Loose, coarse sand with asphalt, concrete and gravel mix, dry.	0
1	SB-3 (0'-2')			0.0		X			1
2				0.0				1.0'-5.0' **(SW-SM) Well graded sand with silt.** Medium dense, Yellowish Red (5YR 4/6), fine sand with silt, non-plastic, dry.	2
3		47"		0.0					3
4				0.0					4
5				0.0					5
6				0.0				5.0'-10.0' **(SW-SM) Well graded sand with silt.** Medium dense, Yellowish Red (5YR 4/6), fine sand with silt, non-plastic, dry.	6
7				0.0					7
8		42"		0.0					8
9				0.0					9
10				0.0					10
11				0.0				10.0'-11.0' **(SW-SM) Well graded sand with silt.** Medium dense, Yellowish Red (5YR 4/6), fine sand with silt, non-plastic, dry.	11
12				0.0				11.0'-11.5' **Rock**	12
13	SB-3 (12'-14')	54"		0.0		X		11.5'-15.0' **(SW-SM) Well graded sand.** Medium dense, Yellowish Red (5YR 4/6), fine sand, non-plastic, dry.	13
14				0.0					14
15				0.0					15

KEY:

SPT = Standard Penetration Test
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BZ = Breathing Zone
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V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering **500 International Drive, Suite 150** **Mount Olive, New Jersey 07828**	CLIENT: LPC Development Group, LLC PROJECT: 105 South 5th Street LOCATION: 105 South 5th St., Brooklyn, NY	WELL ID: **SB-4**
START DATE: 10/26/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 20.0'
COMPLETION DATE: 10/26/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'-2.0' **Fill Material-** Loose, coarse sand with concrete, brick fragments, med-large gravel, dry	0
1	SB-4 (0'-2')			0.0		X			1
2				0.0					2
3		48"		0.0				2.0'-5.0' **(SW-SM) Well graded sand with silt.** Dense, Yellowish-red (5YR 4/6), fine sand with silt, dry.	3
4				0.0					4
5				0.0					5
6				0.4				5.0'-6.0' **(SW) Well graded sand.** Medium dense, Strong Brown (7.5YR 5/8), coarse sand with small - medium gravel, dry.	6
7				0.2				6.0'-10.0' **(SW) Well graded sand.** Dense, Strong Brown (7.5YR 5/8), fine sand with small gravel, dry. Note: White rock observed @ 6.0' to 6.25'	7
8		54"		0.2					8
9				0.0					9
10				0.0					10
11				0.1				10.0'-12.0' **(SW) Well graded sand.** Yellowish-red (7.5YR 5/8), coarse sand with small gravel, dry.	11
12				0.1					12
13	SB-4 (12'-14')	46"		0.1		X		12.0'-12.5' **White Rock** 12.5'-15' **(SW-SM) Well graded sand and silt.** Medium dense, fine sand with silt, non-plastic, dry.	13
14				0.1					14
15				0.1					15
16				0.0				15.0'-17.5' **(SW-SM) Well graded sand and silt.** Medium dense, fine sand with silt, non-plastic, dry.	16
17				0.0					17
18		56"		0.0				17.5'-18' **White Rock** 18'-19.5' **(SW) Well graded sand.** Yellowish-red (7.5YR 5/8), coarse sand with small gravel, dry.	18
19				0.0					19
20				0.0				19.5'-20.0' **Rock**	20
								Boring Refusal at 20.0' bgs	

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
Y = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock

SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-5**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/26/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 23.0'
COMPLETION DATE: 10/26/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'-1.0' **Fill Material-** Very loose, Dark Yellowish Brown (10YR 4/6) coarse sand with silt, large gravel, dry	
1	SB-5 (0'-2')	53"		0.0		X		1.0'-5.0' **(SW-SM) Well graded sand with silt.** Medium dense, Strong Brown (7.5YR 4/6), coarse sand with silt, small gravel, dry. Note: Concrete chunk @ 3.5"	
2				0.0					
3				0.0					
4				0.0					
5				0.0					
6		56"		0.0				5.0'-7.0' **(SW-SM) Well graded sand with silt.** Medium dense, Strong Brown (7.5YR 4/6), coarse sand with silt, small gravel, dry.	
7				0.0					
8				0.0				7.0'-7.5' **Concrete, dry** 7.5'-8.0' **See (5.0'-7.0')**	
9				0.0				8.0'-10.0' **(SW) Well graded sand.** Loose, Yellowish-red(5YR 4/6) fine sand with no gravel, dry.	
10				0.0					
11		56"		0.0				10.0'-13.0' **(SW) Well graded sand.** Loose, Yellowish-red (5YR 4/6) fine sand with no gravel, dry.	
12				0.0					
13	SB-5 (12'-14')			0.0		X			
14				0.0				13.0'-15.0' **(SW-SM) Well graded sand with silt.** Medium dense, Brownish-yellow (10YR 4/6) , coarse sand with silt, small gravel, non-plastic, dry.	
15				0.0					
16		56"		0.0				15.0'-15.5' **See (8.0'-10.0')** 15.5'-18.5' **(SW-SM) Well graded sand with silt.** Dense, Dark Yellowish-brown (10YR 4/6), coarse sand with silt, small gravel, dry.	
17				0.0					
18				0.0					
19				0.0				18.5'-20 **(SW-SM) Well graded sand with silt.** Dense, Yellowish-brown (10YR 4/6), coarse sand, silt, small gravel, dry. Note: White rock @ 18.5'-19.5'	
20				0.0					

SB-5 Continued on Page 2 of 2

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SPT = Standard Penetration Test
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C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Grout
Concrete
Fill
Brick/Rock

SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-5**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/26/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 23.0'
COMPLETION DATE: 10/26/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
20				0.0				20.0'-23.0' **(SW) Well graded sand.** Loose, Yellowish-red (5YR 4/6) fine sand, dry.	20
21		44"		0.0					21
22				0.0					22
23				0.0					23
								Boring Refusal at 23.0' bgs	

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GS = Grab Sample
C = Composite
HS = Headspace
Y = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock

SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering **500 International Drive, Suite 150** **Mount Olive, New Jersey 07828**	CLIENT: LPC Development Group, LLC PROJECT: 105 South 5th Street LOCATION: 105 South 5th St., Brooklyn, NY	WELL ID: **SB-6**
START DATE: 10/26/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 20.0'
COMPLETION DATE: 10/26/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'-1.0' **Fill Material-** Loose, Dark Brown (7.5YR 3/3) coarse sand with small-medium gravel, dr **y.**	0
1	SB-6 (0'-2')			0.0		X			1
2		51"		0.0				1.0'-5.0' **(SW-SM) Well graded sand with silt.** Dense, Yellowish-red (5YR 4/6), fine sand with silt, small gravel, dry. Note: Rock @ 4.5' bgs Geoprobe hit Rock.	2
3				0.0					3
4				0.0					4
5				0.0					5
6				0.0				5.0'-10.0' **(SW) Well graded sand.** Loose, Yellowish-red (5YR 4/6), fine sand, no gravel, no silt, non-plastic, dry.	6
7				0.0					7
8		55"		0.0					8
9				0.0					9
10				0.0					10
11				0.0				10.0'-15.0' **(SW) Well graded sand.** Loose, Yellowish-red (5YR 4/6), fine sand, no gravel, no silt, non-plastic, dry.	11
12				0.0					12
13	SB-6 (12'-14')	56"		0.0		X			13
14				0.0					14
15				0.0					15
16				0.0				15.0'-17.0' **(SW) Well graded sand.** Loose, Yellowish-red (5YR 4/6), fine sand, non-plastic, dry.	16
17				0.0					17
18		55"		0.0				17.0'-19.5' **(SW-SM) Well graded sand with silt.** Dense, Dark Brown (7.5YR 3/3) coarse sand with silt, large gravel, dry.	18
19				0.0					19
20				0.0				19.5'-20.0' **Rock**	20
								Boring Refusal at 20.0' bgs	

KEY:

SPT = Standard Penetration Test
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GS = Grab Sample
C = Composite
HS = Headspace
Y = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

Equity Environmental Engineering	CLIENT: LPC Development Group, LLC	WELL ID: **SB-7**
500 International Drive, Suite 150	PROJECT: 105 South 5th Street	
Mount Olive, New Jersey 07828	LOCATION: 105 South 5th St., Brooklyn, NY	
START DATE: 10/26/2015	DRILLING CO.: Zebra	TOTAL DEPTH: 19.0'
COMPLETION DATE: 10/26/2015	DRILLER: Evan Moraitu	WELL DEPTH: N/A
BORING DIAMETER: 2.5"	DRILL RIG / METHOD: Direct Puch / GeoProbe 7822DT	CASING ELEVATION: N/A
WELL DIAMETER: N/A	LOGGED BY: Faron Moser	DEPTH TO WATER: No GW in Soil Boring
SCREENED INTERVAL: N/A	WELL TYPE: N/A	WATER LEVEL STATIC: N/A
SCREEN TYPE / SLOT: N/A	FILTER PACK: N/A	CASING TYPE: N/A

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample	H2O	Lithology / Remarks	Boring Construction
0				0.0				0.0'-5.0' **Fill Material-** Loose, Dark Brown (7.5YR 3/2) coarse sand with concrete, brick fragments, gravel, dry	
1	SB-7 (0'-2')			0.0		X			
2		32"		0.0					
3				0.0					
4				0.0					
5				0.0					
6				0.0				5.0'-10.0' **(SW) Well graded sand-** Dense, Strong Brown (7.5YR 5/8), fine sand with small-large gravel, dry.	
7				0.0					
8		43"		0.0					
9				0.0					
10				0.0					
11				0.0				10.0'-15.0' **(SW) Well graded sand-** Dense, Dark yellowish brown (10YR 4/6), fine sand, dry.	
12				0.0					
13	SB-7 (12'-14')	58"		0.0		X			
14				0.0					
15				0.0					
16				0.0				15.0'-19.0' **(SW) Well graded sand-** Dense, Dark yellowish brown (10YR 4/6), fine sand , dry.	
17		35"		0.0					
18				0.0					
19				0.0					
								Boring Refusal at 19.0' bgs	

KEY:

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SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Concrete
Fill
Brick/Rock
SW
SM
SP
Rock
SW-SM

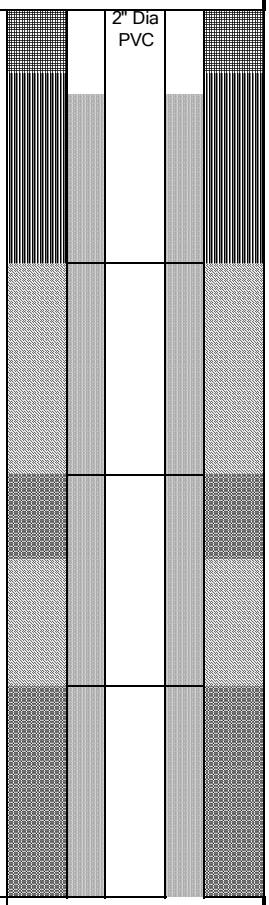
APPENDIX D

MOMITORING WELL CONSTRUCTION LOGS

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID: **MW-1**
500 International Drive , Suite 150	PROJECT:	**2015059**	
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**	
START DATE: **23/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH: **70.0'**
COMPLETION DATE: **24/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH: **55.27'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION: **49.19'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER: **49.00'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC: **46.96'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE: **2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks
0				0.0				0.0'-8.0" **Concrete Slab**
1				0.0				8.0"-5.0' **Fill Material.** Loose coarse sand with large gravel and brick fagments throughout, dry.
2				0.0				
3		NA		0.0				**Note:** Cobble @ 3'
4				0.0				
5				0.0				
6				0.0				5.0'-9.0' **(SW-SM) Well graded sand wih silt.** Medium dense, Strong Brown (7.5 YR 4/6) fine sand with silt, small-medium gravel, medium plasticity, dry.
7				0.0				
8		NA		0.0				
9				0.0				9.0'-10.0' **(SW-SM) Well graded sand wih silt.** Medium dense, Light Brown (7.5YR 6/3) fine sand with silt and small gravel, medium plasticity, dry.
10				0.0				
11				0.0				10.0'-12.0' **(SW) Well Graded Sand.** Loose, medium dense Brownish Yellow (10YR 6/8) fine sand, small gravel and brick fragments throughout, dry.
12				0.0				
13		NA		0.0				12.0' - 15.0' **(SW-SM) Well graded sand wih silt.** Medium dense, Light Brown (7.5YR 6/3) fine sand with silt and small gravel, medium plasticity, dry
14				0.0				
15				0.0				**Note**: Rock observed @ 15.0'
16				0.0				15.0'-20.0' **(SW) Well Graded Sand.** Loose, Med. Dense Brownish Yellow (10YR 6/8) coarse sand with medium to large gravel throughout, dry.
17				0.0				
18		NA		0.0				
19				0.0				
20				0.0				
								CONTINUE BORING TO 40.0' ON PAGE 2

Boring/Well Construction



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C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT: **LPC Dev. Group 95-105 S. 5th Street**	WELL ID: **MW-1**	
500 International Drive , Suite 150	PROJECT: **2015059**		
Mt. Olive, New Jersey 07828	LOCATION: **95-105 S. 5th Street Brooklyn, NY**		
START DATE: **23/12/2015**	DRILLING CO.: **Aquifer Drilling and Testing**	TOTAL DEPTH:	**70.0'**
COMPLETION DATE: **24/12/2015**	DRILLER: **Greg Rivera**	WELL DEPTH:	**55.27'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD: **Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**49.19**
WELL DIAMETER: **2"**	LOGGED BY: **Faron Moser**	DEPTH TO WATER:	**49.00'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE: **Flush Mount**	WATER LEVEL STATIC:	**46.96'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK: **# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
20				0.0				20.0'-25.0' **(SW) Well Graded Sand.** Loose, Light Brown (7.5YR 6/3) coarse sand with medium to large gravel throughout, dry.	2" Dia PVC
21				0.0					
22				0.0					
23		NA		0.0					
24				0.0					
25				0.0					
26				0.0				25.0'-27.0' **(SW) Well Graded Sand.** Loose, Light Brown (7.5YR 6/3) coarse sand with medium to large gravel throughout, dry.	
27				0.0					
28		NA		0.0				27.0'-30.0' **(SW) Well Graded Sand.** Very loose, Light Brown (7.5YR 6/3) fine sand, dry.	
29				0.0					
30				0.0					
31				0.0				30.0'-35.0' **(SW) Well Graded Sand.** Very loose, Light Brown (7.5YR 6/3), fine sand, dry.	
32				0.0					
33		NA		0.0					
34				0.0					
35				0.0					
36				0.0				35.0'-40.0' **(SW) Well Graded Sand.** Very loose, Light Brown (7.5YR 6/3), fine sand, dry.	
37				0.0					
38		NA		0.0					
39				0.0					
40				0.0					
								CONTINUE BORING TO 60.0' ON PAGE 3	

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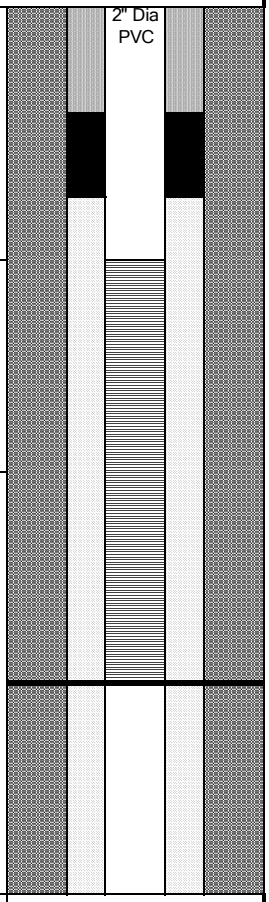
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID: **MW-1**
500 International Drive , Suite 150	PROJECT:	**2015059**	
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**	
START DATE: **23/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH: **60.0'**
COMPLETION DATE: **24/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH: **55.27'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION: **49.19**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER: **49.00'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC: **46.96'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE: **2" diameter SCH40 PVC**

Depth (Ft)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks
40				0.0				40.0'-45.0' **(SW) Well Graded Sand.** Loose, Light Brown (7.5YR 6/3), coarse sand with medium to large gravel throughout, dry.
41				0.0				
42				0.0				
43		NA		0.0				**Bentonite plug from 42.0' - 44.0'**
44				0.0				
45				0.0				
46				0.0				45.0'-50.0' **(SW) Well Graded Sand.** Loose, Light Brown (7.5YR 6/3) coarse sand with medium to large gravel throughout, dry.
47				0.0			V	
48		NA		0.0				**Static Water @ 46.96' (i.e. Depth to water reading with interface probe after well is installed).**
49				0.0				
50				0.0				**Note:** moist sand observed @ 50.0' bgs
51				0.0				50.0' - 55.0' **(SW) Well Graded Sand.** Loose, Light Brown (7.5YR 6/3) coarse sand with small to medium gravel throughout, moist.
52				0.0				
53		NA		0.0				
54				0.0				
55				0.0				
56				0.0				55.0'-60.0' **(SW) Well Graded Sand.** Very loose, Light Brown (7.5YR 6/3), fine sand, dry.
57				0.0				
58		NA		0.0				
59				0.0				
60				0.0				
								DRILLING ENDED @ 60.0' bgs

Boring/Well Construction



KEY:

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GS = Grab Sample
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HS = Headspace
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TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-2**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **22/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **23/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**54.45'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.13'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser and Bob Jackson**	DEPTH TO WATER:	**47.80'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.60'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
0				0.0				0.0'-8.0" **Concrete Slab**	2" Dia PVC
1				0.0				8.0"-2.5' **(SW-SM) Well graded sand with silt** Loose, Yellowish Red (5YR 4/6), coarse sand with silt and gravel, dry.	
2				0.0					
3		NA		0.0				2.5'-5.0' **(SW-SM) Well graded sand with silt** Loose, Yellowish Red (5YR 4/6), fine sand with silt, non-plastic, dry.	
4				0.0					
5				0.0					
6				0.0				5.0'-10.0' **(SW-SM) Well graded sand wih silt.** Dense, Yellowish Red (5YR 4/6), fine sand with silt and small gravel throughout low-plasticity, dry.	
7				0.0					
8		NA		0.0					
9				0.0					
10				0.0					
11				0.0				10.0'-11.0' **(SW-SM) Well graded sand wih silt.** Dense, Yellowish Red (7.5 YR 4/6) coarse sand with some silt. Low plasticity. Dry.	
12				0.0				11.0' - 15.0' **(SW) Well Graded Sand.** Loose,Yellowish Red (7.5 YR 4/6) fine sand, small-medium gravel and cobbles throughout, non-plastic, dry.	
13		NA		0.0					
14				0.0				**Note:** Large rock observed at 11.5'	
15				0.0					
16				0.0				15.0'-20.0' **(SW) Well Graded Sand.** Loose,Yellowish Red (7.5 YR 4/6) fine sand, small-medium gravel and cobbles throughout, non-plastic, dry.	
17				0.0					
18		NA		0.0					
19				0.0					
20				0.0					
								CONTINUE BORING TO 40.0' ON PAGE 2	

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen

SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-2**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **22/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **23/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**54.45'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.13**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser and Bob Jackson**	DEPTH TO WATER:	**47.80'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.60'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
20				0.0				20.0'-25.0' **(SW) Well Graded Sand.** Loose,Yellowish Red (7.5 YR 4/6) fine sand and cobbles throughout, non-plastic, dry.	2" Dia PVC
21				0.0					
22				0.0					
23		NA		0.0					
24				0.0					
25				0.0					
26				0.0				25.0'-30.0' **(SW) Well Graded Sand.** Loose,Yellowish Red (7.5 YR 4/6) fine sand with gravel throughout, non-plastic, moist @ 30.0'	
27				0.0					
28		NA		0.0					
29				0.0					
30				0.0					
31				0.0				30.0'-33.0' **(SW) Well Graded Sand.** Loose,Yellowish Red (7.5 YR 4/6) fine sand, dry.	
32				0.0					
33		NA		0.0					
34				0.0				33.0'-35.0' **(SW-SM) Well graded sand wih silt.** Dense, Yellowish Red (7.5 YR 4/6) fine sand with silt, dry.	
35				0.0					
36				0.0				35.0'-36.0' **(SW) Well Graded Sand.** Loose, grey, sand with gravel, dry.	
37				0.9				36.0'-37.0' **(SW) Well Graded Sand.** Loose, fine sand, dry.	
38		NA		0.0				37.0'-40.0' **(SW-SM) Well graded sand wih silt.** Dense, Yellowish Red (7.5 YR 4/6) coarse sand with silt, low plasticity, dry.	
39				3.2					
40				0.0					
								CONTINUE BORING TO 60.0' ON PAGE 3	

KEY:

SPT = Standard Penetration Test | SS = Split Spoon | BH = Bore Hole | HS = Headspace | TOSC = Top of Screen

CAL = Calibration | A = Auger Cuttings | GS = Grab Sample | V = Water Level | TOS = Top of Sand

BZ = Breathing Zone | GP = Geoprobe | C = Composite | TOB = Top of Bentonite | CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen

SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-2**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **22/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **23/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**54.45'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.13**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser and Bob Jackson**	DEPTH TO WATER:	**47.80'**
SCREENED INTERVAL: **45'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.60'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
40				0.0				40.0'-42.0' **(SW) Well Graded Sand.** Loose, Grey Brown, fine-coarse sand with cobbles. Thin lense of lighter soil @ 41.5' bgs.	2" Dia PVC
41				1.5					
42				1.5					
43		NA		1.5				42.0'-45.0' **Bedrock**	
44				0.0				**Bentonite plug from 42.0' - 44.0'**	
45				0.0					
46				0.0				45.0'-50.0' **Bedrock**	
47				0.0					
48		NA		0.0			V		
49				0.0					
50				0.0					
51				0.0				50.0'-55.0' **Bedrock**	
52				0.0					
53		NA		0.0					
54				0.0					
55				0.0					
56				0.0				55.0'-60.0' **Bedrock**	
57				0.0					
58		NA		0.0					
59				0.0					
60				0.0					
								DRILLING ENDED @ 60.0' bgs	

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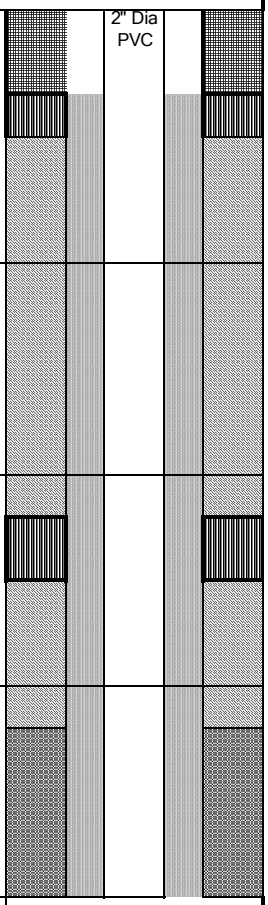
Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-3**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **18/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **22/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**53.86'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.19'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER:	**45.05'**
SCREENED INTERVAL: **40'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.45'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
0				0.0				0.0'-1.0' **Concrete Slab**	
1				0.0					
2				0.0				1.0'-2.0' **Fill Material.** Loose coarse sand with asphalt, brick fragments and concrete	
3		NA		0.0				2.0'-5.0' **(SW-SM) Well graded sand wih silt.** Very dense, Yellowish Red (5YR 4/6) fine sand with silt, medium plasticity, dry.	
4				0.0					
5				0.0					
6				0.0				5.0'-10.0' **(SW-SM) Well graded sand wih silt.** Very dense,Yellowish Red (5YR 4/6) fine sand with silt, medium plasticity, dry.	
7				0.0					
8		NA		0.0				**Note:** Rock observed at 5.5' -6.0'	
9				0.0					
10				0.0					
11				0.0				10.0'-11.0' **(SW-SM) Well graded sand wih silt.** Very dense, Yellowish Red (5YR 4/6) fine sand with silt, medium plasticity, dry.	
12				0.0				11.0' - 12.5' **Asphalt.**	
13		NA		0.0				12.5' - 15.0' **(SW-SM) Well graded sand wih silt.** Dense, Yellowish Red (5YR 4/6) coarse sand with silt and medium gravel, medium plasticity, dry.	
14				0.0					
15				0.0					
16				0.0				15.0'-16.0' **Same as 12.5' - 15.0'**	
17				0.0				16.0'-20.0' **(SW) Well Graded Sand.** Loose, Yellowish Red (5YR 4/6) coarse sand, small gravel throughout, non-plastic, dry.	
18		NA		0.0					
19				0.0					
20				0.0					
								CONTINUE BORING TO 40.0' ON PAGE 2	



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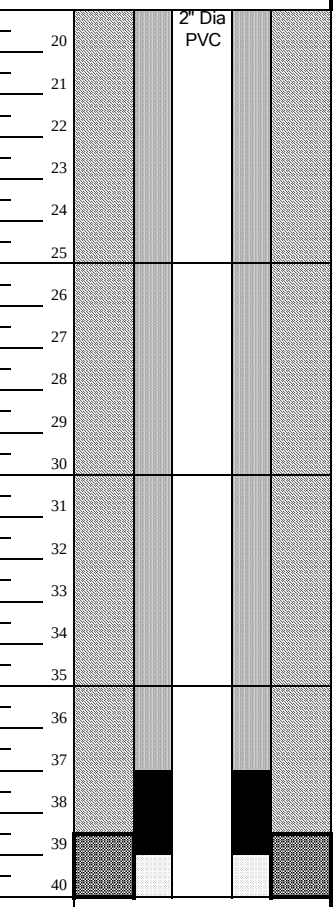
Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-3**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **18/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **22/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**53.86'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.19'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER:	**45.05'**
SCREENED INTERVAL: **40'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.45'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
20				0.0				20.0'-25.0' **(SW-SM) Well graded sand with silt.** Dense, Yellowish Red (5YR 4/6), coarse sand with silt, large gravel and rock mixed throughout, medium plasticity, dry.	20
21				0.0					21
22				0.0					22
23		NA		0.0				**Note:** Large gravel and rock were observed between 23.0' - 25.0' interval.	23
24				0.0					24
25				0.0					25
26				0.0				25.0'-30.0' **(SW-SM) Well graded sand with silt.** Dense, Yellowish Red (5YR 4/6), coarse sand with silt with medium -large gravel and rock mixed throughout, medium plasticity, dry.	26
27				0.0					27
28		NA		0.0				**Note:** Medium to large gravel was observed between 25.0'-27.0'. Large gravel and rock were observed between 27'.0 - 30.0'.	28
29				0.0					29
30				0.0					30
31				0.0				30.0'-35.0' **(SW-SM) Well graded sand with silt.** Loose, Yellowish Red (5YR 4/6), coarse sand with silt,small -large gravel and rock mixed throughout, medium plasticity, dry.	31
32				0.0					32
33		NA		0.0					33
34				0.0					34
35				0.0					35
36				0.0				35.0'-36.5' **(SW-SM) Well graded sand with silt.** Dense, Yellowish Red (5YR 4/6), coarse sand with silt, medium plasticity dry.	36
37				0.0				36.5'-38.5' **(SW-SM) Well graded sand with silt.** Loose, Yellowish Red (5YR 4/6), coarse sand with silt, small -large gravel and rock mixed throughout, medium plasticity, dry.	37
38		NA		0.0					38
39				0.0					39
40				0.0				38.5'-40.0' **Bedrock** **Note: Bentonite plug from 37.0' - 39.0'**	40
								CONTINUE BORING TO 60.0' ON PAGE 3	



KEY:

SPT = Standard Penetration Test | SS = Split Spoon | BH = Bore Hole | HS = Headspace | TOSC = Top of Screen
CAL = Calibration | A = Auger Cuttings | GS = Grab Sample | V = Water Level | TOS = Top of Sand
BZ = Breathing Zone | GP = Geoprobe | C = Composite | TOB = Top of Bentonite | CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-3**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **18/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **22/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**53.86'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**50.19'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER:	**45.05'**
SCREENED INTERVAL: **40'-55'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**47.45'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
40				0.0				40.0'-45.0' **Bedrock**	2" Dia PVC
41				0.0					
42				0.0					
43		NA		0.0					
44				0.0					
45				0.0					
46				0.0				45.0'-50.0' **Bedrock**	
47				0.0					
48		NA		0.0			V	**Static Water @ 47.45' (i.e. Depth to water reading with interface probe after well is installed).**	
49				0.0					
50				0.0					
51				0.0				50.0'-55.0' **Bedrock**	
52				0.0					
53		NA		0.0					
54				0.0					
55				0.0					
56				0.0				55.0'-60.0' **Bedrock**	
57				0.0					
58		NA		0.0					
59				0.0					
60				0.0					
								DRILLING ENDED @ 60.0' bgs	

KEY:

SPT = Standard Penetration Test
SS = Split Spoon
BH = Bore Hole
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TOSC = Top of Screen
CAL = Calibration
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Plug, Slurry, Concrete, Sand, Screen

SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID: **MW-4**
500 International Drive , Suite 150	PROJECT:	**2015059**	
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**	
START DATE: **24/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH: **60.0'**
COMPLETION DATE: **24/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH: **53.95'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION: **48.13'**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER: **45.65'**
SCREENED INTERVAL: **44'-54'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC: **45.65'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE: **2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
0-5		NA		0.0 0.0 0.0 0.0 0.0 0.0				0.0'-5.0' **Fill Material.** Medium dense, coarse sand with brick fragments and large gravel and some silt, dry.	2" Dia PVC
5-10		NA		0.0 0.0 0.0 0.0 0.0				5.0'-10.0' **(SW-SM) Well graded sand wih silt.** Loose, Yellowish-red (5YR 4/6) fine sand with silt, dry.	
10-15		NA		0.0 0.0 0.0 0.0 0.0				10.0'-12.0' **(SW-SM) Well graded sand wih silt.** Loose, Yellowish-red (5YR 4/6) fine sand with some silt, dry. 12.0'-15.0' **(SW-SM) Well graded sand wih silt.** Medium Dense, Dark Brown (7.5YR 3/3) coarse sand with silt. Brick fragments and large rocks were observed throughout, dry.	
15-20		NA		0.0 0.0 0.0 0.0 0.0				15.0'-18.0' **(SW-SM) Well graded sand wih silt.** Loose, Yellowish-red (5YR 4/6) fine sand with some silt, dry. 18.0'-18.5 **Rock** 18.5'-20.0' **(SW) Well graded sand.** Medium dense, Dark Brown (7.5YR 3/3) coarse sand with medium gravel throughout. Brick fragments were observed throghout, dry.	
								CONTINUE BORING TO 40.0' ON PAGE 2	

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GP = Geoprobe
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C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Plug, Slurry, Concrete, Sand, Screen
SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT: **LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-4**
500 International Drive , Suite 150	PROJECT: **2015059**		
Mt. Olive, New Jersey 07828	LOCATION: **95-105 S. 5th Street Brooklyn, NY**		
START DATE: **24/12/2015**	DRILLING CO.: **Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **24/12/2015**	DRILLER: **Greg Rivera**	WELL DEPTH:	**53.95'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD: **Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**48.13**
WELL DIAMETER: **2"**	LOGGED BY: **Faron Moser**	DEPTH TO WATER:	**45.65'**
SCREENED INTERVAL: **44'-54'**	WELL TYPE: **Standpipe**	WATER LEVEL STATIC:	**45.65'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK: **# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
20				0.0				20.0'-25.0' **(SW) Well graded sand.** Medium dense, Dark Brown (7.5YR 3/3), coarse sand with large gravel throughout. cobbles were observed throghout, dry.	2" Dia PVC
21				0.0					
22				0.0					
23		NA		0.0					
24				0.0					
25				0.0					
26				0.0				25.0'-27.0' **(SW) Well graded sand.** Medium Dense, Dark Brown (7.5YR 3/3) coarse sand with large gravel throughout, cobbles were observed throghout, dry.	
27				0.0					
28		NA		0.0				27.0 -30.0' **Bedrock** **Note:** Rig could not advance passed 27.0' due to bedrock refusal. Sampling drill casing was replaced with driving casing to advance through bedrock.	
29				0.0					
30				0.0					
31				0.0				30.0'-35.0' **Bedrock**	
32				0.0					
33		NA		0.0					
34				0.0					
35				0.0					
36				0.0				35.0'-40.0' **Bedrock**	
37				0.0					
38		NA		0.0					
39				0.0					
40				0.0					
								CONTINUE BORING TO 60.0' ON PAGE 3	

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TOSC = Top of Screen
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V = Water Level
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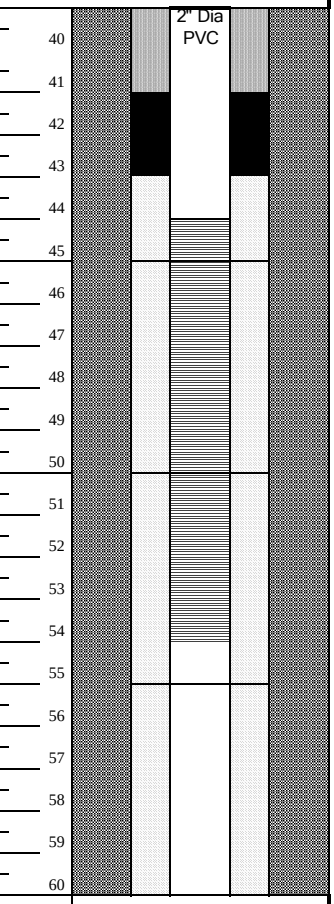
Plug, Slurry, Concrete, Sand, Screen

SW-SM, SM, FILL, ROCK, SW

Equity Environmental Engineering	CLIENT:	**LPC Dev. Group 95-105 S. 5th Street**	WELL ID:	**MW-4**
500 International Drive , Suite 150	PROJECT:	**2015059**		
Mt. Olive, New Jersey 07828	LOCATION:	**95-105 S. 5th Street Brooklyn, NY**		
START DATE: **24/12/2015**	DRILLING CO.:	**Aquifer Drilling and Testing**	TOTAL DEPTH:	**60.0'**
COMPLETION DATE: **24/12/2015**	DRILLER:	**Greg Rivera**	WELL DEPTH:	**53.95'**
BORING DIAMETER: **6"**	DRILL RIG / METHOD:	**Geoprobe 8140LC - Sonic**	CASING ELEVATION:	**48.13**
WELL DIAMETER: **2"**	LOGGED BY:	**Faron Moser**	DEPTH TO WATER:	**45.65'**
SCREENED INTERVAL: **44'-54'**	WELL TYPE:	**Flush Mount**	WATER LEVEL STATIC:	**45.65'**
SCREEN TYPE / SLOT: **2" diameter PVC/ 020 Slot**	FILTER PACK:	**# 2 Well Grade Sand**	CASING TYPE:	**2" diameter SCH40 PVC**

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Boring/Well Construction
40				0.0				40.0'-45.0' **Bedrock**	40
41				0.0					41
42				0.0				**Bentonite plug from 41.0' - 43.0'**	42
43		NA		0.0					43
44				0.0					44
45				0.0					45
46				0.0			V	45.0'-50.0' **Bedrock** **Water @ 45.65' bgs**	46
47				0.0					47
48		NA		0.0					48
49				0.0					49
50				0.0					50
51				0.0				50.0'-55.0' **Bedrock**	51
52				0.0					52
53		NA		0.0					53
54				0.0					54
55				0.0					55
56				0.0				55.0'-60.0' **Bedrock**	56
57				0.0					57
58		NA		0.0					58
59				0.0					59
60				0.0					60
								DRILLING ENDED @ 60.0' bgs	



KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Grout
Bentonite
Sand
Screen

SP-SM
SM
SP
ROCK
SW

APPENDIX E
EXCAVATION WORKPLAN

E-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B

Table 1: Notifications*

NYSDEC Project Manager – Melissa Sweet	(518) 402-9614 New York State Department of Environmental Conservation 625 Broadway, Albany, NY 12233-7015 melissa.sweet@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O Connell	Jane O'Connell 718-482-4995 New York State Department of Environmental Conservation 47-40 21st Street Long Island City, NY 11101-5401 jane.oconnell@dec.ny.gov;
NYSDEC Site Control – Kelly Lewandowski	Kelly Lewandowski (518)402-9553 New York State Department of Environmental Conservation 625 Broadway, Albany, NY 12233-7015 Kelly.lewandowski@dec.ny.gov,

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix F of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

E-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section B-4 of this Appendix.

E-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

E-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all significant invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck decon station will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will

be decontaminated at the station before leaving the site until the activities performed under this section are complete. Truck decon waste will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

E-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks loaded with site materials will exit the vicinity of the site using only approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

E-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

E-7 MATERIALS REUSE ON-SITE

The probability of the reuse of excavated soil from the subject property is extremely low. If the need arises, the following will be required in accordance with DER-10 requirements:

- Procedure for determining if reuse is appropriate:
  - Sampling (methods and analytical)
  - Stockpile segregation scheme for on-site reuse
- Size of stockpiles, location (figure)

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

E-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

E-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the decision document. The existing cover system is comprised of a minimum of 8-12 inches of clean stone and asphalt pavement or concrete covered sidewalks and concrete building, etc. The demarcation layer, will be replaced to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

E-10 BACKFILL FROM OFF-SITE SOURCES

The probability that there will be a need for imported backfill is extremely low. Should there be a need for the import of backfill from an offsite source, the following will be provided:

- Source area approval following the DER-10 sampling and approval process
  - Sources of backfill material
  - Source area background check
- Chemical sampling for the appropriate analytes at the required frequency
  - Imported Soil Chemical Quality Standards
- Applicability of protection of groundwater SCOs
- Stockpile procedures for imported backfill material
  - Size of stockpiles, cover, etc.

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are the restricted residential standards. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

E-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

E-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

E-13 COMMUNITY AIR MONITORING PLAN

Given the configuration of the site, the air monitoring locations are limited to the driveway/parking lot and the South 5th Street side of the building. They will be adjusted on a daily or more frequent basis to the extent possible based on actual wind directions to provide an upwind and downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

E-1 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. Specific odor control methods to be used on a routine basis will include the necessary materials for the situation. At a minimum, the source will be covered, kept wet, and/or a chemical suppressant used. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

E-15 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

APPENDIX F

HASP & CAMP

Project Name: 105 South 5th Street
Project Number: 2014074

EQUITY ENVIRONMENTAL ENGINEERING, LLC
500 International Drive, Suite 150
Mount Olive, New Jersey 07828

SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN

Address: 105 South 5th Street Brooklyn, New York 11201

Plan Revisions

Number	Date	Initials
1	5/6/15	RLJ
2	7/6/16	FU
3		
4		

Faron Moser _____ _____
Site Supervisor (SS) Date

Robert Jackson _____ _____
Project Manager (PM) Date
Health and Safety Officer
Plan Preparer

Neha Gautam _____ _____
Alternate Health & Safety Officer Date

Table of Contents

FORMS

Introduction

This Site-Specific Health and Safety Plan (HASP) has been prepared by Equity Environmental Engineering, LLC (Equity) to summarize the work related health and safety hazards at the subject site (105 South 5th Street, Brooklyn, New York) and the requirements and procedures to protect its employees from them. This plan meets or exceeds the requirements of Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120, for a site-specific health and safety plan.

This plan was designed to reduce the potential for occupational illness or injury resulting from working at this site. The purpose of the HASP is to inform Equity's employees of the health and safety risks present at this site, and the proper methods of protecting themselves from those risks. Each worker must be fully aware of the risks associated with the work to be accomplished, and be dedicated to completing that work safely.

Existing and potential hazards at this site have been identified. As new information becomes available, this HASP will be revised. Standard practices and procedures of industrial hygiene, occupational health, safety, and environmental protection are prescribed in this plan, which was prepared and reviewed by experienced professionals.

Equity employees who work on this site must read the HASP and sign the form included in this plan, to indicate that they understand the plan's contents, and agree to comply with its provisions. Anyone who cannot, or will not comply with this HASP will be excluded from on-site activities. Violations of this HASP or any applicable federal, state, or local health and safety regulations should be reported immediately to the Site Supervisor (SS), or to Equity's Health & Safety Officer (HSO).

This HASP will be readily available so workers can reference it when necessary.

Site Information

Location: 105 South 5th Street, Brooklyn, NY 11201

Current Site Information:

The subject property currently consists of a multi-story building located at 105 South 5th Street (Block 2443 /Lots 6, 37 and 41) in Brooklyn. This is an initial investigation of the subject property.

Location/Class: [X] Industrial [ ] Commercial [ ] Urban/Residential
[ ] Suburban [ ] Rural

Site Regulatory Status: [ ] CERCLA/SARA [ ] US EPA [ ] NYCDEP
[ ] NPL [ ] RCRA [ ] NJ ISRA
[X] Other (OER) [ ] Not Regulated

Operations or Tasks to be Performed, and Approximate Duration of Each:

1- **Subsurface geophysics survey**
2- **Installation and sampling of soil borings, soil-gas points and monitoring wells.**
3- **Excavation of contaminated soils.**
4- **Back-fill with clean soil.**
5- **Installation of vapor mitigation system**

Surrounding Population/Structures:

The area surrounding the subject property is mixed residential and commercial/industrial.

Site and Surrounding Topography:

The topography is generally flat.

Known or Suspected Pathways of Contaminant Dispersion:

None

Emergency Shower, Eyewash and First Aid Equipment Located at:

Eyewash and emergency shower will be available.

First aid provided by emergency services (911).

Personnel On-Site trained in First Aid:

1. N. Gautam
2. F. Moser
3. B. Jackson
4. P. Jaran
5. _____
6. _____
7. _____
8. _____

Emergency Medical Care

Hospital

Hospital Name: SUNY Downstate Medical Center Telephone #: 888-270-7869

Address: 450 Clarkson Ave, Brooklyn, NY 11203

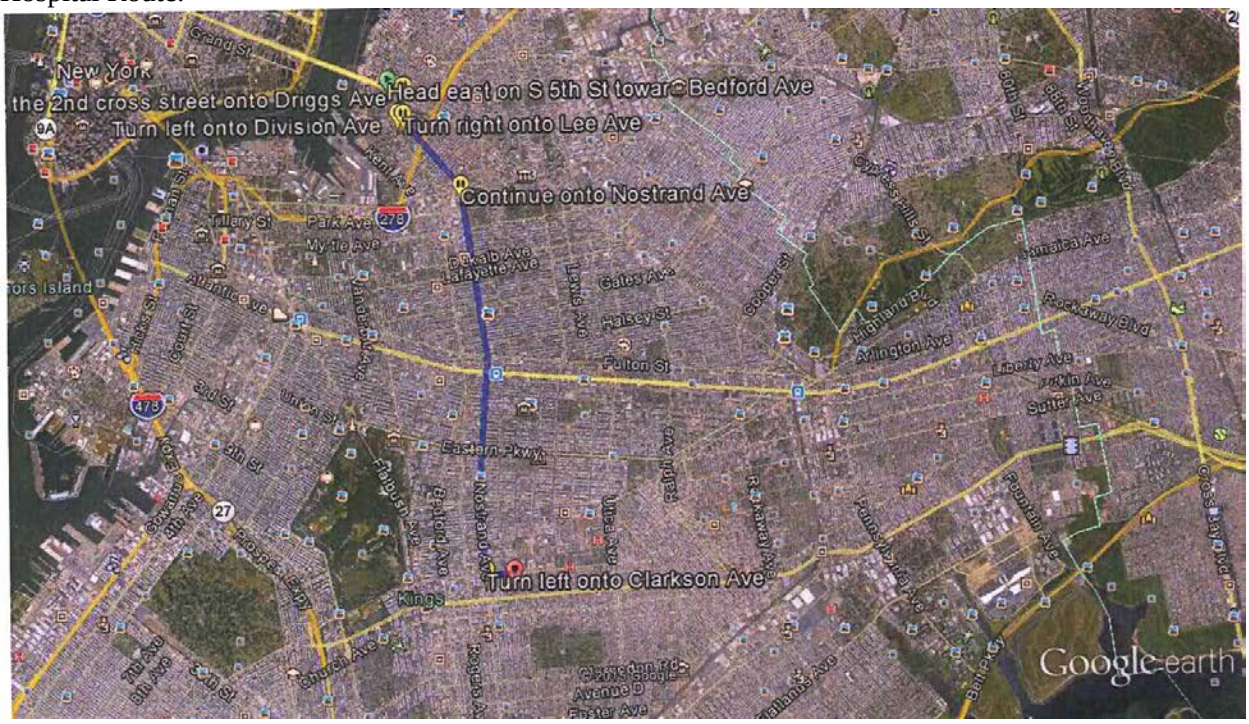
Contact: Operator Telephone #: 888-270-7869

Type of Service (X) Physical Trauma Only

( ) Physical Trauma and Chemical Exposure

( ) Available 24 Hours

Hospital Route:



1. Head east on S 5th St 0.1 mi
2. Turn right onto Driggs Ave 0.2 mi
3. Turn left onto Division Ave 0.2 mi
4. Turn right onto Lee Ave 0.7 mi
5. Continue onto Nostrand Ave 3.1 mi
6. Turn left onto Clarkson Ave – 0.2 mi

Hospital route information has been provided to satisfy OSHA requirements (29 CFR 1910.120). **However, where 911-emergency service and/or transport is available, Equity personnel are strictly prohibited from transporting accident victims in either company or personal vehicles.

Transporting the injured in non-emergency vehicles increases the potential for motor vehicle accidents during transit to the hospital and further injury to the victim. Also, the victims' condition can worsen during transit. As a result, transportation in non-emergency vehicles can delay or even prevent treatment by trained emergency personnel during a critical time. Employees must remain at the site of the accident, administer appropriate first aid, and await the arrival of **trained emergency and/or rescue personnel.**

Emergency Contacts

	Town	**Phone**
Fire Department	NYC	911
Police Department	NYC	911 / (212) 334-0611
Site Contact	Equity Personnel	(973) 641-0825
Site Telephone	Equity Personnel	(973) 641-0825
Nearest Telephone	Equity Personnel	TBD
First Aid/EMS	NYC	911
Federal Agency Representative	NA	NA
State Agency Representative	NA	NA
Local Agency Representative	NA	NA
Pesticide Poisoning	NA	(800) 845-7633
NY Poison Control Center	State-wide	(212) 764-7667
CHEM TREC	Washington, DC	(800) 424-9300
Utility	**Company Name**	**Phone**
Water Supply	NYC DEP	*
Sewer	NYC DEP	*
Power	Con Edison	*
Telephone	*	*
Gas	National Grid	*
NY One Call	NY	811

* NY One Call will supply this information

Equity Environmental Engineering LLC Emergency Contact List
Cell Phone Numbers

Peter Jaran	(973) 479-2381
Bob Jackson	(973) 641-0825
Faron Moser	(201) 341-1323
Neha Gautam	(201) 916-3416

Key Project Personnel

The following describes the project position assignments, associated responsibilities, and reporting relationships.

Position	Job Description	Interactions
Project Manager (PM)	Responsible for technical and administrative performance of the project. Supports Site Supervisor and is available to him at all times. Will visit the site periodically, or as necessary. Reports progress of project on a regular basis. Assigns key personnel, and identifies, requests, secures, and monitors use of resources for project. Approves program expenditures and invoices.	Reports directly to Managing Director. Works closely with Site Supervisor.
Site Supervisor (SS)	Acts as point of contact for client and client's representative(s). Supervises all on-site personnel and subcontractors. Coordinates daily site-specific work efforts, and ensures all activities are in strict compliance with site-specific health and safety plan. Has authority to suspend all work that possesses any health and safety risk. Briefs subordinate technical personnel on task requirements. Identifies and resolves technical problems. Provides periodic review of project progress.	Reports directly to Project Manager.
Health & Safety Officer (HSO)	Develops, implements, and enforces the on-site safety program. Oversees all health and safety aspects of project, conducts periodic audits to ensure compliance. Available at all times to discuss project progress and health and safety related issues.	Reports directly to Managing Director. Works closely with Project Manager, and Site Supervisor.
Onsite Health Physicist	Implementing the radiation safety at the Site with authorization to stop work due to unsafe acts, unsafe conditions, non-compliance and/or non-implementation of the Safety Plan and/or applicable safety and health requirements; performs the proper operation of radiation monitoring equipment; conducts radiation surveys; and notifies anomalies to the site supervisor.	Reports directly to Site Supervisor.

Equity is the entity responsible for managing health and safety for its employees at this site. Key project personnel are as follows:

Project Manager:	Robert Jackson	973-527-7451/974-641-0825
HSO	Name	Telephone / Cellular Number
Site Supervisor:	Faron Moser	973-527-7451/201-341-1323
	Name	Telephone / Cellular Number
Alternate SSO:	Neha Gautam	973-527-7451/201-916-3416
		Telephone / Cellular Number

Medical Surveillance and Training Dates for Authorized Personnel

Employee	Medical Exam	OSHA 8-Hr.	Site Supervisor Training	Respirator Fit Test
Bob Jackson	12/12/14	11/11/2013	9/27/2004	12/13/2012
Peter Jaran	12/16/14	11/11/2013		12/13/2012
Faron Moser	4/1/2014	1/28/2014		
Neha Gautam	3/4/2014	6/25/2013		

Task Identification

Tasks covered under this plan:

Task #	Description
1	Surface geophysics Survey
2	Installation of soil borings, soil-gas points and monitoring wells
3	Collection of soil, soil-gas and groundwater samples.
4	Excavation of contaminated soils
5	Back-fill with clean soil
6	Installation of vapor mitigation system

Off-site tasks planned? No

Describe:

Chemical Hazards

Task No.(s)	Chemical Name (or class)	PEL	TLV	Other Pertinent Limits (specify)	Primary Hazard			SDS Attached (Y/N)
					Ingestion	Dermal	Inhalation	
2, 3	Isobutylene (PID Calibration Gas)	250 ppm	250 ppm		x	x	x	Y
2,3 and 4	Benzo(a) anthracene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Benzo(a)pyrene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Benzo(b) fluoranthene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Chrysene *	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Indeno (1,2,3-cd) Pyrene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Mercury	0.1 mg/m^3	0.025 mg/m^3		x	x	x	Y

* Values based on OSHA Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene)

PEL – OSHA Permissible Exposure Limit: the maximum allowable 8-hour time weighted average (TWA) exposure concentration.
TLV – ACGIH Threshold Limit Value: the recommended 8-hour TWA exposure concentration.
STEL – ACGIH or OSHA Short-term Exposure Limit: the maximum allowable 15-minute TWA exposure concentration.
Ceiling – OSHA and Cal-OSHA Ceiling Limit: the maximum exposure concentration above, which an employee shall not be exposed during any period without respiratory protection.
IDLH – Immediately Dangerous to Life and Health: the concentration at which one could be exposed for 30 minutes without experiencing escape-impairing or irreversible health effects.

Physical and Biological Hazards

Hazard	Yes	No	Task No.(s)	Hazard	Yes	No	Task No.(s)
Electrical (overhead lines)		X	1,2,3,4.5	Uneven Terrain		X	
Electrical (underground lines)	X		1,2,3,4.5	Unstable Surfaces	X		1,2,3,4.5
Gas Lines	X		1,2,3,4.5	Elevated Surfaces		X	
Water Lines	X		1,2,3,4.5	Lightning	X		1,2,3,4.5
Drilling Equipment	X		1,2,3,4.5	Rain	X		1,2,3,4.5
Excavation Equipment	X		1,2,3,4.5	Snow	X		1,2,3,4.5
Power Tools	X		1,2,3,4.5	Liquefied/Pressurized Gases		X	
Heat Exposure	X		1,2,3,4.5	Lifting Equipment		X	
Cold Exposure	X		1,2,3,4.5	Vermin	X		1,2,3,4.5
Oxygen Deficiency		X		Insects	X		1,2,3,4.5
Confined Spaces		X		Disease-causing organisms	X		1,2,3,4.5
Noise	X		1,2,3,4.5	Others, e.g., marine sampling (specify)		X	
Ionizing Radiation		X					
Non-Ionizing Radiation		X					
Fire	X		1,2,3,4.5				
Explosive Atmospheres		X					
Shoring	X		1,2,3,4.5				
Scaffolding		X					
Holes/Ditches	X		1,2,3,4.5				
Steep Grades		X					
Slippery Surfaces	X		1,2,3,4.5				

Risk Analysis

Task #	Substance	Concentration (if known)	Risk*
1,2,3	Isobutylene (PID Calibration Gas)	250 ppm	1
2,3 and 4	Benzo(a) anthracene	1.39 mg/kg	1
2,3 and 4	Benzo(a)pyrene	1.25 mg/kg	1
2,3 and 4	Benzo(b) fluoranthene	1.62 mg/kg	1
2,3 and 4	Chrysene	1.31 mg/kg	1
2,3 and 4	Indeno (1,2,3-cd) Pyrene	0.957 mg/kg	1
2,3 and 4	Mercury	0.97 mg/kg	1

*Risk
0 – No Risk
1 – Slight Risk
2 – Moderate Risk
3 – Dangerous Conditions/Caution
4 – High Risk
5 – Extremely Dangerous

General Safety Rules

1. If an employee must work alone, he/she must call his/her supervisor twice a day. If the supervisor is unavailable, that supervisor's supervisor must be contacted.

2. Workers must wear all personal protective equipment required for the tasks to be performed.

3. Horseplay or practical jokes are forbidden on the job.

4. Compressed air must not be used to blow dirt from clothing, or played with or blown at another person.

5. Drinking of alcoholic beverages or the use of drugs on the job is prohibited. Their use will cause immediate dismissal from the site.

6. All areas must be continually cleaned to maintain good housekeeping. Trash is to be piled neatly and removed promptly. All tools and work areas are to be kept in clean and safe condition.

7. Competent workers must do welding and cutting.

8. Ladders are to be of proper design and tied off while in use. Do not go up or down a ladder without the free use of both hands. Use a rope to lift or lower materials or tools. Always face a ladder when climbing or descending.

9. Every work site must have a complete first aid kit.

10. **ALL** accidents must be investigated and reported. Use the Accident Investigation Form in the back section of this plan.

11. Injuries sustained while on duty must be reported to supervisor immediately, or as soon as possible after injury is sustained.

12. Explosives must be handled and transported by licensed people only.

13. All tools and electrical equipment must be in proper working order.

14. Clothing appropriate to the duties performed shall be worn by all workers. Large pockets, loose jewelry, cuffed trousers and loose or torn clothing are dangerous and should not be worn around machinery, or when climbing ladders, or working on structures.

Heat Stress

Site employees will be trained to recognize signs of heat stress. The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as worker monitoring results. Appropriate rest periods will be provided to help site workers accommodate to temperature extremes.

Signs and Symptoms of Heat Stress

- **Heat rash** may result from continuous exposure to heat or humid air.
- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
  - muscle spasms
  - pain in the hands, feet and abdomen
- **Heat exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms are:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting
- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:
  - red, hot, usually dry skin
  - lack of reduced perspiration
  - nausea
  - dizziness and confusion
  - strong, rapid pulse
  - coma

Measures to Avoid Heat Stress

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternate job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak hours, such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.

Site personnel should monitor their pulse rate as an indicator of heat strain by the following method:

At the beginning of the rest period, count the radial pulse during a 30-second period. If the rate exceeds 110 beats per minute, lengthen the rest period by one-third. If the heart rate still exceeds 110 beats per minute at the end of the rest period, shorten the next work cycle by one-third.

Cold Stress

Equity will provide appropriate rest periods to help site workers accommodate to temperature extremes. Site employees will be trained to recognize signs of cold stress.

Measures to Avoid Cold Stress

- Wear multi-layer clothing (the outer most layer should be of wind-resistant fabric)
- Drink warm fluids
- Work in pairs
- Avoid heavy sweating

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Equivalent Chill Temperature (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-195
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect).	LITTLE DANGER In <hr. with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as environmental monitoring results.

Employee Training Program

All personnel performing work in areas on this site covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an 8-hour refresher-training course and/or initial 40-hour training course within the last two years prior to performing any intrusive work on this site covered by this HASP. Records that demonstrate that all persons subject to the training requirements have actually met them will be maintained either on site or in the project file. The Project Manager and/or Supervisor are responsible for verifying compliance of the project team with these rules.

Prior to commencement of on-site activities, a site safety meeting will be held to review the specific information and requirements of this HASP. HASP sign-off sheets will be collected at the end of this meeting.

Site Specific Training (when applicable) will include:

- Explanation of the overall site HASP.
- Health and safety personnel and organization.
- Brief site history.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use and limitations of available safety.
- Personal hygiene and decontamination.
- Respirator face-piece fit testing.
- PPE use and maintenance.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication.
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Contingency plan.

Prior to work, each Equity employee will attend the contractor's health and safety orientation, if applicable. In addition, Equity's employees will review health and safety items specific to the tasks to be performed that were not covered in the contractor's orientation.

Site Health and Safety Meetings

In addition, the Site Supervisor will meet daily with all Equity employees prior to beginning work on site. The agenda of the meeting will include a review of important elements of this plan, any special safety items, and a discussion of the emergency response procedures. Also, everyone will agree on a schedule for periodic meetings, (for example, before beginning work each day), to review the effectiveness of this plan and make changes as necessary. If significant changes at the site occur, special meetings will be scheduled.

Training Records

The Site Supervisor will complete a report of the daily safety meetings, using the form in the back section of this plan, and all attending the meeting will sign the Daily Safety Meeting Log.

The training status of contractor and subcontractor employees will be verified that their training criteria meets the requirements specified in 29 CFR 1910.120(e). A copy of all training certificates will be kept for Equity personnel working at the site.

Personal Protective Equipment (PPE) Requirements

Task No.(s)	Level of Protection (A – D)*	Level of Upgrade	PPE Suit	PPE Gloves	PPE Feet	PPE Head	PPE Eye	PPE Ear	PPE Respirator	Additional PPE for Upgrade
1,2,3	D	NA	Std	N	Steel	HH	Glasses	Plugs	NA	

SUIT

Std = Standard Work Clothes
Tyvek = Uncoated Tyvek Disposal Coverall
PE Tyvek = Polyethylene-coated Tyvek
Saranex = Saranex-laminated Tyvek
PVC Suite = PVC Raingear

GLOVES

Work = Work Gloves (canvas, leather)
Neo = Neoprene Gloves
PVC = PVC Gloves
N = Nitrile Gloves
V = Vinyl Gloves
L = Latex Gloves

FEET

Steel = Steel-toe shoes or boots
Steel+ = Steel-toe shoes or boots & PVC boots
Booties = PVC booties

HEAD

HH = Hardhat

EYE

Glasses = Safety glasses
Goggles = Goggles
Shield = Face shield

EAR

Plugs = Earplugs
Muff = Ear muffs

RESPIRATOR

APR = Air purifying respirator
Full APR = Full face APR
Half APR = Half face APR
SAR = Airline supplied air respirator
SCBA = Self-contained breathing apparatus
Escape = Escape SCBA
OV = Organic Vapor Cartridge
AG = Acid Gas Cartridge
OV/AG = Organic Vapor/Acid Gas Cartridge
AM = Ammonia Cartridge
Dust/Mist = Dust/Mist pre-filter and cover for cartridge
HEPA = High efficiency particulate air filter cartridge

* For unspecified volatile organics (based on 1-minute breathing zone measurement using PID or OVA):

Up to 1 ppm above background	Level D
1 – 5 ppm above background	Level C
5 – 500 ppm above background	Level B
500 ppm above background	Level A

** Earplugs will be available on-site, but are not required

Suggested Levels of Protection

Level "D" Protection

1. Coveralls (optional)
2. Gloves
3. Boots/shoes – steel toe
4. Boots (outer) chemical resistant (disposable- if required)
5. Safety glasses or chemical splash goggles
6. Hard hat (safety shield if required)

Level "C" Protection

1. Full-face, air-purifying, canister-equipped respirator (NIOSH/MSHA approved)
2. Chemical resistant clothing (coveralls; hooded, two-piece, chemical splash suit; chemical resistant hood & apron; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Escape mask
10. Two-way radio

Level "B" Protection

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Chemical resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical splash suite; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Two-way radio

Level "A" Protection (Equity does not perform work in Level A PPE)

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Fully encapsulating, chemical-resistant suit
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots, chemical-resistant, steel toe (depending on suit construction, work over or under suit boot)
7. Hard hat (under suit)
8. Two-way radio

Medical Surveillance

Requirements

All Equity employees covered by this HASP, who engage in site activities governed by 29 CFR 1910.120 for 30 or more days per year, must meet the medical surveillance requirements specified in 1910.120(f). Therefore, such personnel must have completed occupational medical baseline or surveillance examination, performed by a licensed physician, within the last 24 months. The medical examination includes the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing
- Spirometry
- Audiometry
- Blood Chemistry Panel (e.g., SMAC-20)
- Complete Blood Count with Differential
- Urinalysis
- Chest X-Ray (every two years at a minimum)
- Electrocardiogram (at physician's discretion)

Examinations are required upon hiring, termination, and exposure to substances at or above the PEL.

Results of the examinations are communicated directly from the physician to the employee. Medical records for Equity's employees are kept by the Company and the employee

Monitoring Requirements

Monitoring is to be conducted by the Site Supervisor, or his/her designee. Copies of monitoring results and calibration logs will be filed with the HASP.

Monitoring is designed to assess exposure to employees during site activities, and to determine if PPE is required and adequate to assure protection. Because investigation and remediation activities at hazardous waste sites are of an inconsistent nature, it is not possible to assign a monitoring protocol that excludes, or is not directly dependent upon, professional judgment in determining when monitoring is required to assess exposure. Thus, the following generic protocol must be followed at a minimum, and should be modified to be more conservative (e.g., require more monitoring) if deemed necessary by the Site Supervisor or HSO. Under no conditions will the required frequency be decreased.

At a minimum, air monitoring will be conducted before and during each task or activities for which air monitoring has been designated. If airborne concentrations of contaminants reach action levels based on observations with the direct reading instruments, then the appropriate PPE upgrade or work stoppage order will be enforced by the Site Supervisor. In case a work stoppage order is given, the area must be cleared of all personnel immediately.

The use of action levels and the basis for the selection of monitoring equipment is explained as follows:

Action levels determine:

(1) the PPE to be used by site workers
(2) their ability to remain and work in the exclusion zone

The selection of the specified monitoring equipment is based on

(1) the nature of the contaminants
(2) the likely concentrations of the contaminants
(3) the probable duration of exposure
(4) the relative sensitivity of the monitoring equipment to the specific contaminants

The following summarizes the calibration requirements for the air monitoring instruments used at the site:

Instrument	Calibration Frequency
PID: Mini RAE-3000 (or equivalent)	Beginning of each work shift

Air Monitoring and Contaminant Action Levels

Task No.(s)	Location	Contaminant	Monitoring Equipment	Monitoring Frequency	Action Level Concentration	
					Mandatory Respirator Use	Mandatory Work Stoppage
1,2,3	Work Areas	Volatile Organic	PID: Mini-Rae	Periodically during all tasks/activities.	NA	10 ppm above background in breathing zone

PID = Photoionization Detector (e.g., Multi-Rae, Mini-Rae, HNU, TIP, OVM)
FID = Flame Ionization Detector (e.g., OVA)
LEL-O_2 = Explosivity and Oxygen Meter

Name(s) of individual(s) responsible for performing the monitoring, and certifying the results:
All Equity personnel

Type, make and model of instruments used: Mini-Rae 3000 (or equivalent) PID Gas Monitor

Method and frequency of calibration:

- 100 ppm isobutylene-calibration gas. Calibrated prior to each day's use according to manufacturer's instruction.
- The calibration of all radiation survey instrumentation will be conducted using calibration standards traceable to the National Bureau of Standards, All instruments used for surveys will be calibrated every six months and after instrument repair when required. All instrument calibrations will be performed by the original manufacturer or a qualified vendor. Instruments will be response checked to a known source of radiation prior to and after field use.

Procedures for Handling Anticipated Wastes

Waste Generation

Anticipated: Yes___X___ No ____

Types: Liquid ___X___Solid ___X___ Sludge _____Gas _____

Quantity: Expected volume of each type: Field determined

This project ____ will __X__ will not generate hazardous wastes. These wastes will be:
_____ stored _____ treated
__ transported ___ manifested in accordance with NYS and federal regulations.

Any soil and/or groundwater produced from sampling activities will remain onsite.

Packaging requirements for waste material:

_____
_____
_____
_____

Spill Prevention and Response

Potentially hazardous spill situations can be mitigated by using containment devices and materials in work areas. If site conditions are suitable, earthen berms will be constructed around specific areas. If site conditions are not suitable for this, or the potential spill is smaller, barriers will be constructed with sorbent materials such as "speedi-dry", sorbent booms and/or straw bales. Dikes and berms will also be used to divert stormwater run-on and run-off away from critical zones.

Because a spill cleanup must be conducted under crisis conditions, it is important that the methods used for dealing with a spill be thought out beforehand. However, the steps followed cannot be inflexible, because no two spills are identical. Factors that will be assessed in the event of any and all spills include:

1. The volume of the hazardous substance released and the rate of release.
2. The nature of the spill material.
3. What danger exists to personnel in the immediate area.
4. Nature of damage and possibilities of repair.
5. If the transfer of material to an alternate containment is advisable.
6. Feasibility of the construction of a containment dike.
7. Nature of spill area.
8. Whether the spilled substance has reached a watercourse or sewer.
9. Danger of explosion or fire.
10. Equipment and supplies necessary to confine the material and carry out the cleanup.

In most cases, the success of a cleanup operation is dependent upon the time it takes to contain the spill. Therefore, Equity's first attempt at spill containment will be at the point of discharge. This can often be accomplished by closing valves, reinforcing or repairing damaged containers, moving or changing the position of fallen or ruptured containers, or emptying the container by pumping to a temporary storage or holding vessel. Pumps, suction hoses and containers will be available to recover spilled materials when directed to do so by the Site Supervisor.

Handling and transport of drummed waste always must be conducted in a controlled and safe manner, which will minimize damage to structurally sound drums, repacks and overpacks. If leakage or spillage of waste occurs, the drum must immediately be placed within an overpack unit. Overpack units must be provided at each staging area, at areas of existing drums, and along all site roadways.

Task/Work Area	Potential Spill or Discharge	Equipment, Materials, and Procedures for Spill Cleanup
Soil excavation	Hydraulic fluid from drill rig	Pads/Speedy Dry

Emergency Procedures

Potential emergencies that may arise are most likely to be associated with physical hazards from heavy equipment operation and/or lifting and loading of debris. Emergency response will, in most cases, be performed in Level D protection.

Modifications to these emergency procedures may be necessary after the actual site set-up, based on prevailing conditions. Periodic reviews of these procedures will be performed by the Site Supervisor to ensure that they are appropriate for all anticipated emergencies.

Responsibilities

The Site Supervisor has the authority and responsibility to commit company resources to appropriately respond to an emergency, and to exclude all personnel not directly responding to the emergency.

Prior to beginning work at the site, Equity will designate an employee, usually the Site Supervisor, to be responsible for initiating any emergency response actions. In the event an injury or illness requires more than first aid treatment, the Site Supervisor (or alternate) will accompany the injured person to the hospital, and will remain with the person until release, admittance is decided, or another Equity staff relieves them of this responsibility.

Evacuation Plan

The basic elements of an emergency evacuation plan include employee training, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation.

When appropriate, wind direction will be discussed during the daily safety briefing to all on-site personnel by the Site Supervisor to indicate possible routes of upwind escape. Work-area entrance and exit routes will be planned, and emergency escape routes will be delineated by the Site Supervisor. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, will result in the evacuation of the team and a re-evaluation of the hazard and the level of protection required. This re-evaluation will be conducted by appropriate on-site health and safety personnel in coordination with the HSO

In the highly unlikely event that barrels, canisters, or chemical gases or vapors are uncovered during site work, the following procedures shall be followed:

1) In the event that barrels, canisters, or any other vessels are encountered during excavation, all work shall immediately cease and all workers to be removed from the area. The Site Supervisor shall be immediately notified, and he/she shall identify vessel contents, handling procedures and storage and disposal techniques prior to starting work.

2) In the event that high concentrations of gases or vapors are detected, the following actions will be taken:

    - Remove all workers from the area
    - Monitor gas or vapor concentrations to determine the type of respiratory protection that will be required before workers reenter the area.

3) In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were ruptured during excavation or drilling, all on-site personnel will be evacuated to a safe distance. The HSO and Emergency services will be contacted immediately and the risk will be assessed prior to restarting work.

Training

Employees will be instructed in the specific aspects of emergency evaluation applicable to the site as part of the site safety meeting prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. During the site safety meeting, all employees will be trained in, and reminded of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes used during an emergency.

On a continuous basis, individual employees should be constantly alert for indicators of potentially hazardous situations, and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. In the event of any emergency that necessitates an evaluation of the site, on-site personnel will be notified by the use of car horns sounded in regularly spaced, repeated blasts, as detailed in the next section of this procedure. The Site Supervisor will control the site until the appropriate local or state agency representatives arrive, if required. He will also contact the HSO.

Alarm Systems Emergency Signals

The simplest and most effective emergency communication system, in any situation, is direct voice communications. Voice communications will be supplemented anytime voices cannot be clearly perceived above ambient noise levels (e.g., noise from heavy equipment, drilling rigs or backhoes0, and anytime a clear line-of-sight cannot be easily maintained among all site personnel because of distance, terrain, or other obstructions. When voice communications must be supplemented, the following emergency signals, using car horns, will be used.

- One Horn Blast: General Warning

One blast is used to signal relatively minor, but important events on site. An example would be a minor chemical spill where there is no immediate damage to life or health, yet personnel working on site should be aware of the situation so unnecessary problems are avoided. If one horn blast is sounded, personnel must stop all activity and equipment on site and await further instruction from the Site Supervisor.

- Two Horn Blasts: Medical Emergency

Two blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded, all first aid and CPR trained personnel should respond, as appropriate. All other activity and equipment should stop, and personnel should await further instructions from the Site Supervisor.

- Three Horn Blasts Followed by One Continuous Blast: Immediate Danger to Life or Health

Three blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) to all employees on site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, and all personnel must evacuate the site to an appropriately designated site located outside the site gate, or further off site if necessary. (Note: unless otherwise specified, all decontamination procedures must be implemented.) All personnel must be accounted for by the Site Supervisor, and other response actions determined by the Site Supervisor must be followed.

Employees on site will use the "buddy" system (pairs). Buddies should pre-arrange hand signals or other means of emergency communication in case radios cannot be used, or if the radios no longer operate. The following had signals are suggested:

1. Hand gripping throat: out of air, can't breathe.
2. Grip partner's wrist or place both hands around waste: leave area immediately, no debate.
3. Hand on top of head: need assistance.
4. Thumbs up: OK, I'm alright, I understand.
5. Thumbs down: No, negative.

Visual contact will be maintained between employee pairs. Team members will remain in close proximity to each other in order to provide assistance in case of emergencies, and will inform each other of any of the following effects of exposure to site contamination:

- headaches
- dizziness
- blurred vision
- cramps
- irritation of eyes, skin or respiratory tract

If any member of the work crew experiences any adverse symptoms while on site, the entire work crew will immediately stop work and follow the instructions provided by the Site Supervisor.

Medical Treatment/First Aid

Community emergency services (EMS, fire, and police) will be notified immediately if their resources are needed on site. If necessary, the injured or sick party shall be taken to the nearest hospital.

Emergency Reporting

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage will be reported to Equity. An incident investigation will be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigations will begin while details are fresh in the mind of all involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency, quality of work, as well as safety and health concerns.

On-Site Evacuation Plan –A series of repeated blasts is the signal for all Equity personnel and subcontractors to evacuate the site and assemble at:

To be determined at the beginning of each field event

The criteria for activating the alarm will be the first sign of any serious problem that requires assistance or evacuation. Should either a fire or explosion occur, all personnel will proceed immediately to the evacuation assembly point and await further instructions. At that time a personnel check will be conducted to determine if anyone is missing, and the local fire and police departments will be called for assistance. Once on site, the acting officer of the fire department and the Site Supervisor will determine if further evacuations are necessary. No Equity personnel will re-enter the site without clearance from the fire/police department and Site Supervisor. Subcontractor

Safety It has been and shall continue to be the policy of Equity that employees of all subcontractors are required to adhere to all applicable company, local, state, and federal safety rules and regulations.

When an infraction of a local, state, federal, or company safety regulation is observed, the Site Supervisor will request verbally that the subcontractor's supervisory personnel correct the infraction immediately. If correction is not made, then the project manager will request in writing that proper corrective action be taken. Subcontractors who continue to ignore proper safety procedures will have payments withheld until compliance is achieved or be terminated.

Subcontractors are required to hold safety meetings for their employees when they are working on Equity projects, and submit documentation of such meetings to the Project Manager. At a minimum they shall have specific safety procedures for proper use of all heavy equipment such as excavators, drilling rigs, etc., on site during the project. Subcontractor employees are required to attend Equity's safety meetings.

Forms

Job Safety & Health Protection

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees' employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational salary and health standards, and its Compliance Safety and Health Officers conduct job site inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection. If they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period with which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each non-serious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

There are also provisions for central penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violation, the Act also encourages efforts by labor and management before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort if requested. Also, your local OSHA office can provide considerable help and advice on saving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State of Labor or Health Department or a State University.

Under provisions of Title 29, Code of Federal Regulations, part 1903.2(s)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

HASP Sign-Off Form

INSTRUCTIONS: Site personnel are required to read, understand, and agree to the provision of the plan. Personnel are required to sign this form indicating agreement. The original of this form is maintained by the Project Manager, and becomes part of the permanent site project files upon completion of site work.

Site Name: South 5th Street

Location: 105 South 5th Street, Brooklyn, New York

Project Name and Number: 2014074

I have read, understand, and agree to comply with the provisions of this HASP for work activities on this site.

Name	Signature	Company/Agency	Date

Equipment Calibration Log

Operator Name:_____ Instrument Notice:_____

Signature:_____ Serial Number:_____

Date	Time	Concentration	Comments

Sampling Log

Operator Name:_____ Instrument Notice:_____

Signature:_____ Serial Number:_____

Was the equipment calibrated? _____ Yes _____ No

Date	Time	Concentration	Comments

Heat Stress Monitoring Log

Employee Name							
Start Time							
Measurement 1 Pulse Work Minutes Rest Minutes							
Measurement 2 Pulse Work Minutes Rest Minutes							
Measurement 3 Pulse Work Minutes Rest Minutes							
Measurement 4 Pulse Work Minutes Rest Minutes							
Measurement 5 Pulse Work Minutes Rest Minutes							
Measurement 6 Pulse Work Minutes Rest Minutes							
Measurement 7 Pulse Work Minutes Rest Minutes							
Measurement 8 Pulse Work Minutes Rest Minutes							

Signature of Site Supervisor (or designee) Date

Daily Sign In/Sign Out Form

(to be completed on site)

Site Name: South 5th Street

Location: South 5th St, Brooklyn, New York

Employee Name	Company Name	Purpose	Time In	Time Out	Date

Signature of Site Supervisor (or designee) Date

Daily Safety Meeting Log

(to be completed on site)

Site Name South 5th St.

Location South 5th St, Brooklyn, New York

Weather _____

Topics _____

_____

_____

_____

_____

_____

_____

Employee Names: Signatures

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Signature of Site Supervisor (or designee) Date

ACCIDENT INVESTIGATION REPORT

Place Accident Occurred:		Name of Person Involved:	
Site Location		Age / Sex	Job Title
		Yrs in This Job	Yrs with Company
Date & Time of Incident AM ___/___/_____:___ PM		Date & Time of Investigation AM ___/___/_____:___ PM	
Date Incident Reported ___/___/	Reported to Whom	Investigated By:	
Regulatory Agencies or Insurance Carriers Contacted:		Witness(es):	
Description from injured or witnesses (use reverse side of form for more space): Signature Date			

Select one or more in each column. Don't hesitate to write in your own words (continue on reverse side, if necessary).

When completing the following task:
- ☐Operating (what machine)_____
- ☐Using (what tool)_____
- ☐Handling (what material)_____
- ☐Maintenance or repair (of what)_____
- ☐Office or sales task_____
- ☐Other -- Provide details_____

The following occurred:
- ☐Amputation (total or partial)_____
- ☐Burn (thermal)_____
- ☐Burn (chemical)_____
- ☐Electric shock_____
- ☐Concussion/unconscious_____
- ☐Crushing injury (contusion, crush, bruise) -- intact skin_____
- ☐Cut, laceration, puncture, abrasion_____
- ☐Fracture or dislocation_____
- ☐Sprain/strain_____
- ☐Cumulative trauma_____
- ☐Occupational illness or disease_____
- ☐Internal injuries_____
- ☐None -- Near accident_____
- ☐Other -- Provide details_____
- ☐Respiratory_____

To the (explain details):
- ☐Head, face, neck_____
- ☐Eye_____
- ☐Trunk, abdomen_____
- ☐Back (upper, lower)_____
- ☐Arm, shoulder_____
- ☐Fingers_____
- ☐Leg, hip, knee_____
- ☐Ankle, foot_____
- ☐Toes_____
- ☐Internal Injuries_____
- ☐Body System:_____
- ☐Circulatory_____
- ☐Digestive_____
- ☐Musculoskeletal_____
- ☐Nervous_____
- ☐Other_____
- ☐Other (specify)_____

Person was, or got:
- ☐Struck against (not including falls)_____
- ☐Struck by_____
- ☐Fell from (from a higher level)_____
- ☐Slipped, tripped, fell on (in the same level)_____
- ☐Foreign body in eye_____
- ☐Contacted electrical energy from_____
- ☐Exposure to (substance)_____
  - from inhalation_____
  - ingestion_____
  - skin absorption_____
- ☐Vehicle accident_____
- ☐Caught in, under or between_____
- ☐Repetitive_____
- ☐Other_____

While (taking what position) Where (or What):
- ☐Carrying_____
- ☐Climbing_____
- ☐Bending_____
- ☐Driving_____
- ☐Jumping_____
- ☐Kneeling_____
- ☐Lifting - below waist, give weight)_____
- ☐Lifting - above waist, give weight)_____
- ☐Pulling_____
- ☐Pushing_____
- ☐Reaching or stretching_____
- ☐Riding_____
- ☐Running_____
- ☐Sitting_____
- ☐Standing_____
- ☐Throwing_____
- ☐Twisting or turning_____
- ☐Walking_____
- ☐Other_____

Medical Treatment (check as many as apply)
- ☐The injured employee was able to return to work the same day.
- ☐The injured employee was sent home
- ☐The injured employee was sent to a doctor/ clinic; list the doctor/clinic name, address, and phone:_____

- ☐The employee was hospitalized.

List name and address of hospital:

Attending physician:_____

What conditions contributed
- ☐Awkward job procedure
- ☐Inadequate guard/safety device
- ☐Inadequate warning/labeling system
- ☐Fire/explosion hazard
- ☐Not secured against moving
- ☐Poor housekeeping
- ☐Protruding object
- ☐Close clearance/congestion
- ☐Hazardous arrangement/storage
- ☐Defective tools/equipment
- ☐Inadequate ventilation
- ☐Atmospheric condition: gases,

What unsafe procedures contributed
- ☐Operating without training/authority
- ☐Failure to follow proper procedure
- ☐Failure to secure
- ☐Operating at unsafe speed
- ☐Failure to warn/signal
- ☐Congestion
- ☐Used defective equipment
- ☐Used equipment improperly/unsafely
- ☐Improper loading or placement
- ☐Horseplay/distraction
- ☐Improper protective equipment
- ☐Improper lifting or carrying

The underlying causes of the incident are:
- ☐Unaware of job hazards
- ☐Inattention to hazard
- ☐Unaware of how to avoid incident
- ☐Not enough time to act
- ☐Person motivated to use unsafe procedure
- ☐Emotional/mental/physical stress
- ☐Equipment failed to perform as expected
- ☐Intoxicant/drugs
- ☐Failure to report/correct unsafe condition
- ☐Illness/medical condition
- ☐Work procedure not ergonomically correct
- ☐Substandard design

Classification (check as many as apply)
- ☐Fatality
- ☐Medical treatment other than First Aid
- ☐Occupation illness or disease
- ☐First Aid
- ☐Environmental Release
- ☐Property Damage
- ☐Near-accident

dusts, fumes, vapors
☐Repetitive motion
☐Illumination/noise hazard
☐Other

☐Taking unsafe or awkward position
☐Servicing moving equipment
☐Other

☐Other

ACCIDENT DESCRIPTION (continued):

What steps have already been taken to prevent similar incidents?_____

What else can be done (engineering controls, training, enforcement, process changes) to eliminate the hazard?_____

_____
Site Supervisor Signature Date

Health and Safety Review: Is proposed action appropriate? Yes ☐ No ☐ Comments_____

_____
HSO Signature Date

VEHICLE ACCIDENT REPORT

EMPLOYEE NAME:_____ DRV LIC NO.:_____

COMPANY ADDRESS:_____ INSURANCE COMPANY_____

POLICY NO.:_____

DESCRIPTION OF ACCIDENT

DATE:_____ TIME:_____ SPEED LIMIT_____:

LOCATION:_____

DIRECTION OF TRAVEL:_____

HOW DID IT HAPPEN?_____

_____

USE SPACE BELOW TO INDICATE VEHICLE PATHS - INDICATE NORTH BY ARROW

POLICE REPORT

NAME OF OFFICER: _____ BADGE #:_____

DEPARTMENT:_____ LOCATION:_____

SUMMONS ISSUED? Y [ ] N [ ] TO WHOM?_____

YOUR VEHICLE

YEAR/MAKE:_____ REGIST #:_____

DRIVEN BY:_____ AGE:_____ TEL #:_____

ADDRESS:_____ CITY:_____ STATE:_____

NATURE OF DAMAGE:_____

OTHER DRIVER
(continue below for additional drivers and witnesses)

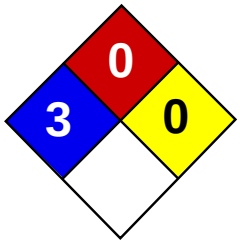
NAME:_____ DRV LIC NO.:_____

ADDRESS:_____ VEHICLE REGISTRATION:_____

_____ INSURANCE COMPANY_____

POLICY NO.:_____

Safety Data Sheets



Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

SUPELCO INC -- 48499, INDENO (1,2,3-CD) PYRENE 10MG -- 6810-00N032522

========== Product Identification ==========

Product ID:48499, INDENO (1,2,3-CD) PYRENE 10MG
MSDS Date:06/06/1985
FSC:6810
NIIN:00N032522
MSDS Number: BNSSK
=== Responsible Party ===
Company Name:SUPELCO INC
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Country:US
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:54968
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968

========== Composition/Information on Ingredients ==========

Ingred Name:INDENO 1,2,3-CD PYRENE
CAS:193-39-5
RTECS #:NK9300000
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:REPORTED ANIMAL CARCINOGEN.
Explanation of Carcinogenicity:INDENO(1,2,3-CD) PYRENE: GROUP 2B(IARC),
ANTICIPATED TO BE CARCINOGEN (NTP).
Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES: FLUSH WITH WATER FOR AT LEAST 15 MIN. SKIN: FLUSH WITH
LARGE VOLUMES OF WATER. REMOVE CONTAMINATED CLOTHING. INHAL: MOVE
TO FRESH AIR. IF BREATHING STOPS, GIVE ARTF RESP. INGEST: IMMED
CONTACT A PHYSICIAN.

========== Fire Fighting Measures ==========

Flash Point:400F,204C
Extinguishing Media:CO2, DRY CHEMICAL.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .

========== Accidental Release Measures ==========

Spill Release Procedures:SWEEP UP MATERIAL. AVOID GENERATING DUST.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTR IN COOL, DRY LOCATION. KEEP AWAY FROM OXIDIZERS. STORE IN DRY, WELL VENTILATED AREA.
Other Precautions:REPORTED CANCER HAZARD. AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Ventilation:USE ONLY IN EXHAUST HOOD.
Protective Gloves:NEOPRENE GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

========== Physical/Chemical Properties ==========

HCC:T6
Melt/Freeze Pt:M.P/F.P Text:324F,162C
Vapor Pres:0.10
Appearance and Odor:YELLOW CRYSTALS

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS. METALLIC SODIUM & POTASSIUM.

========== Disposal Considerations ==========

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS.

Material Safety Data Sheet

Chrysene, 98%

ACC# 95251

Section 1 - Chemical Product and Company Identification

MSDS Name: Chrysene, 98%
Catalog Numbers: AC224140000, AC224140010, AC224140050, AC224145000, NC9381297, XXAC22414-300G
Synonyms: 1,2-Benzophenanthrene; Benzo(a)phenanthrene; 1,2,5,6-Dibenzonaphthalene.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
218-01-9	Chrysene	98	205-923-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: very light beige solid.
Caution! May cause eye and skin irritation. May cause respiratory tract irritation. May cause cancer in humans.
Target Organs: Liver, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation.
Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or

water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.
Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chrysene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Chrysene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: very light beige
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 448 deg C @ 760 mm Hg
Freezing/Melting Point:250-255 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density: Not available.
Molecular Formula:C18H12
Molecular Weight:228.29

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 218-01-9: GC0700000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).

- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Chrysene was mutagenic to S. Typhimurium in the presence of an exogenous metabolic system.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified Fish toxicity : LC50 (96hr) Neauthes arenacedentata >1ppm.(Rossi,S.S. et al Marine Pollut. Bull. 1978) Invertebrate toxicity : lethal treshold concentration (24hr) Daphnia Magna 0,7æg/l.(* Newsted,J.L. et al Environ. Toxicol. Chem. 1987) Bioaccumulation : 24hr Daphnia Magna log bioconcentration factor 3.7845 (*)
Environmental: Degradation studies : biodegradated by white rot fungus (Proc.Annu.Meet.Am.Wood-Preserv.Assoc.1989) May be utilised by axenic cultures of microorganisms e.g. Pseudomonas pancimobilis EPA505, which may have novel degradative systems(Mueller,J.G. et al ppl.Environ.Microbiol.1990; Mueller, J.G. et al Environ.Sci.Technol.1991).
Physical: Not found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 218-01-9: waste number U050.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	No information available.
Hazard Class:	9	
UN Number:	UN3077	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 218-01-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Chrysene (CAS# 218-01-9, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Chrysene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 218-01-9: 0.35 æg/day NSRL (oral)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: No information available.

Canada - DSL/NDSL

CAS# 218-01-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/30/1999
Revision #5 Date: 3/15/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

CHEM SERVICE INC -- F74 BENZO/B/FLUORANTHENE -- 6550-00F037517

========== Product Identification ==========

Product ID:F74 BENZO/B/FLUORANTHENE
MSDS Date:09/11/1990
FSC:6550
NIIN:00F037517
MSDS Number: BWJGM
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US
Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-692-3026/800-452-9994
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone: 610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:BENZO (B) FLUORANTHENE (SUSPECTED CARCINOGEN BY NTP, IARC GROUP 2B) *94-4*
CAS:205-99-2
RTECS #:DF6350000
Other REC Limits:A2 CARCINOGEN
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL LD50 (RAT/MOUSE): 72 MG/KG
Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Explanation of Carcinogenicity:SEE INGREDIENTS

========== First Aid Measures ==========

First Aid:EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR

15-20 MINS. IF NOT BURNED, WASH W/SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. KEEP WARM & QUIET. IN GESTION: DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING OCCURS, WATCH CLOSELY TO AVOID AIRWAY OBSTRUCTION. OBTAIN MEDICAL ATTENTION IN ALL CASES.

========== Fire Fighting Measures ==========

Extinguishing Media:CO2, DRY CHEMICAL POWDER/SPRAY.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR APPRORPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFAC ES TO REMOVE ANY RESIDUES.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN A COOL DRY PLACE ONLY W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED. FOR LABORATORY USE ONLY.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATH VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT PHYSICAL CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation:CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection:EYE SHIELDS
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:334.4F
Appearance and Odor:CRYSTALLINE SOLID

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%
Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000
Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.
Danger! May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.
Target Organs: Reproductive system, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.
Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.
Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

		pitches).	

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: yellow to brown
Odor: faint aromatic odor
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 495 deg C @ 760 mm Hg
Freezing/Melting Point:175 - 179 deg C
Decomposition Temperature: Not available.
Solubility: 1.60x10-3 mg/l @25°C
Specific Gravity/Density: Not available.
Molecular Formula:C20H12
Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 50-32-8: DJ3675000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen

- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: Mutagenic effects have occurred in humans.Mutagenic effects have occurred in experimental animals.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:		9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 50-32-8 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: immediate, delayed.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 43 May cause sensitization by skin contact.
R 45 May cause cancer.
R 46 May cause heritable genetic damage.
R 60 May impair fertility.
R 61 May cause harm to the unborn child.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 50-32-8: No information available.

Canada - DSL/NDSL

CAS# 50-32-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #7 Date: 6/30/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

SUPELCO,INC. -- BENZO(A)ANTHRACENE 0.1G,48563 -- 6810-00N010656

========== Product Identification ==========

Product ID:BENZO(A)ANTHRACENE 0.1G,48563
MSDS Date:05/16/1985
FSC:6810
NIIN:00N010656
MSDS Number: BHYRL
=== Responsible Party ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Info Phone Num: 814-359-3441
Emergency Phone Num: 814-359-3441
CAGE:HO582
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
Box:City:BELLEFONTE
State:PA
ZIP:16823-0048
Phone: 814-359-3441
CAGE:HO582

========== Composition/Information on Ingredients ==========

Ingred Name:BENZ A ANTHRACENE (SARA III)
CAS:56-55-3
RTECS #:CV9275000
Other REC Limits:N/K
ACGIH TLV:A2 ; 9394
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

========== Hazards Identification ==========

Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:SEE SIGNS AND SYMPTOMS OF OVEREXPOSURE.
Explanation of Carcinogenicity:SUSPECTED HUM CARCIN/KNOWN ANIM CARCIN (NTP 1985).INADEQ EVID FOR CARC IN HUM,SUFF EVID FOR CARC IN ANIMALS (IARC 1987).
Effects of Overexposure:EYES/SKIN/INGESTION/INHALATION:N/K .
Medical Cond Aggravated by Exposure:N/K

========== First Aid Measures ==========

First Aid:EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.REMOVE CONTAMINATED CLOTHING.INGESTION:CONTACT PHYSICIAN.INHALATION:IMMEDIAATELY MOVE TO FRESH AIR.GIVE OXYGEN IF B REATHING IS LABORED.IF BREATHING STOPS,GIVE ARTIFICIAL RESPIRATION.CONTACT PHYSICIAN.

========== Fire Fighting Measures ==========

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:CO*2,FOAM,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .

========== Accidental Release Measures ==========

Spill Release Procedures:SWEEP UP MATERIAL.VENTILATE AREA.AVOID GENERATING DUST.
Neutralizing Agent:N/K

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.KEEP AWAY FROM OXIDIZERS.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RUBBER
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:438C,820F
Melt/Freeze Pt:M.P/F.P Text:157C,315F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:PALE YELLOW CRYSTAL.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

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AIR LIQUIDE™

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NONFLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:
Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable **CHEMICAL FAMILY NAME:** Not Applicable **FORMULA:** Not Applicable

Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
U.S. SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
BUSINESS PHONE:	1-410-228-6400 (8 a.m. to 5 p.m. U.S. EST)
General MSDS Information**:**	1-713-868-0440
Fax on Demand:	1-800-231-1366
EMERGENCY PHONE:	
Chemtrec: United States/Canada/Puerto Rico:	1-800-424-9300 [24-hours]
Chemtrec International:	1-703-527-3887 [24-hours]

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
			TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this gas mixture contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, Isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

CHRONIC: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

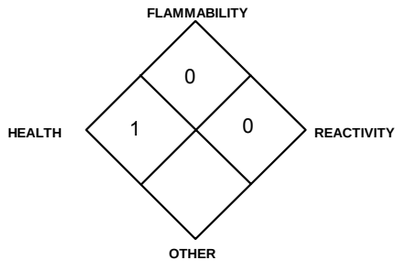
FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft^3 (1.153 kg/m^3)
BOILING POINT: -195.8°C (-320.4°F)
FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906
pH: Not applicable.
SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023
MOLECULAR WEIGHT: 28.01
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
SPECIFIC VOLUME (ft^3/lb): 13.8
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m^3)
FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)
BOILING POINT: -183.0°C (-297.4°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105
pH: Not applicable.
SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.04.91
MOLECULAR WEIGHT: 32.00
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
VOLUME (ft^3/lb): 12.1
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.
DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture:

ISOBUTYLENE:
LC_{50} (inhalation, rat) = 620,000 mg/kg/4 hours
LC_{50} (inhalation, mouse) = 415,000 mg/kg
NITROGEN:
There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.
SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.
REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.
Embryotoxcity: No embryotoxic effects have been described for the components in this gas mixture.
Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.
Reproductive Toxicity: No reproductive toxicity effects have been described for the components in gas mixture.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.
BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65
NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life.
EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1956
PACKING GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).
SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.
Note: DOT 39 Cylinders ship in a strong outer carton (outer package). Pertinent shipping information goes on the outside of the outer package. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1956
PACKING GROUP: Not Applicable
HAZARD LABEL: Class 2.2 (Non-Flammable Gas)
SPECIAL PROVISIONS: None
EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:
U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.
U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.
U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.
OTHER U.S. FEDERAL REGULATIONS:

- No component of this gas mixture is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs).
- Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82).

15. REGULATORY INFORMATION (continued)

- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.
Florida - Substance List: Oxygen, Isobutylene.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Isobutylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: : No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. CALGAZ will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 *"Safe Handling of Compressed Gases in Containers"*
AV-1 *"Safe Handling and Storage of Compressed Gases"*
"Handbook of Compressed Gases"

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This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of CALGAZ knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Community Air Monitoring Plan
(CAMP)
LPC Development Group LLC
337 Berry and 95-105 South 5th Street
Brooklyn, New York

1.0 INTRODUCTION

1.1 Background

In accordance with the New York State Department of Health (NYSDOH) and New York State DER-10 Technical Guidance for Site Investigation and Remediation, 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.

This CAMP has been developed to address particulates (dust) and potential subsurface organic vapors that may be released to the air during implementation of the interim remedial action activities. The CAMP was prepared in accordance with New York State Department of Health (NYSDOH) requirements presented in Appendix 1A of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (2010). The CAMP requires real-time monitoring for dust and organic vapors at the upwind and downwind perimeters of each designated work area. The measures included in the CAMP will provide a level of protection for the occupants of the neighboring properties and water bodies as well as the downwind community, from potential airborne releases. The CAMP sets forth specific action levels for determining monitoring frequency and the appropriate corrective actions, including work shutdown.

1.2 Objectives and Procedures of the CAMP

The intention of the CAMP is to monitor air quality at areas where soil is being disturbed or loaded during the remedial activities as stated in the Interim Remedial Measures Work Plan. The CAMP for this project describes monitoring of dust and vapors on a real-time, continuous basis. Air monitoring will involve standard monitoring functions for environmental projects including real-time air monitoring for particulate matter less than 10 micrometers in size (PM-10) and volatile organic compounds (VOCs); observations for visible dust emissions and odors; inspection and monitoring of the contractor's work practices; and reporting to the NYSDEC and NYSDOH.

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, the installation of soil borings or monitoring wells, and vapor mitigation systems. As such, continuous monitoring will be performed during all ground intrusive actives associated with the project site.

The objectives of the CAMP consist of the following:

- Monitor dust as PM-10 on a real-time, continuous basis such that dust associated with the investigative and remedial actions is maintained below action levels.

- Monitor organic vapors as VOCs on a real-time, continuous basis such that potential vapors associated with the investigative and remedial actions are maintained below action levels.

- Monitor odors and dust emissions (based on olfactory and visible evidence) so that vapors and dust from work areas do not leave the Site.

- In the event that PM-10 or VOC concentrations exceed action levels, Site personnel will be immediately notified so that all necessary corrective actions can be taken.

1.3 Future Actions

Should there be any intrusive work onsite, the CAMP will be implemented to ensure the safety of the field team, tenants, and local residents.

2.0 CAMP PROCECDURES

2.1 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 will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- 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.

- 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.

- 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.

2.2 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.

- 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.

- 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.

- All readings will be recorded and be available for State (DEC and DOH) personnel to review.

3.0 Monitoring Equipment

The activities, as part of the CAMP, will be performed by trained and qualified personnel. In addition, Equity personnel who perform air monitoring functions described in this CAMP will be experienced in the use of air monitoring equipment and procedures.

All monitoring equipment will be calibrated on a daily basis (before the monitoring session begins) in accordance with the manufacturer's operation instructions. A dedicated field notebook will be maintained during the course of the CAMP which will provide record of the details, time and dates of calibration and concentrations of the particulate matter and organic vapors throughout the monitoring sessions.

The equipment to be used throughout this CAMP consists of the following:

- TSI DUSTTRAK II Desktop 8530 Dust/Aerosol Monitor – with PM-10 filter and Strobe light/Audible Alarm and Data logger. One upwind and one downwind station will be utilized as part of the CAMP.

- MiniRAE 3000 (or equivalent) Photoionization Detector. One upwind and one downwind unit will be utilized as part of the CAMP.

4.0 Controlling Particulate Generation and Migration

It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential-- such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

- Applying water on haul roads;
- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly tarped or watertight containers;
- Restricting vehicle speeds to 10 mph;
- Covering excavated areas and material after excavation activity ceases; and
- Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using

atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX G

OPERATIONS & MAINTENANCE

O&M MANUAL - SSDS

The O&M Manual provides protocols for the operation and maintenance of a remedial system. The procedures detailed in the O&M Manual do not replace the manufacturer's documents for specific remedial components but rather supplement such documents and provide for a concise, organized reference document for the remedial system and associated remedial components for operation and maintenance.

The O&M Manual includes all as-built drawings and catalog-cuts on all fixed and mobile equipment necessary to operate and maintain the remedial system including any pumps, blower, air strippers, etc. Catalog-cuts will include maintenance procedures, spare parts lists, and any special tool requirement as well as vendor/service contact/local dealer information, including address and telephone numbers.

The O&M Manual is to be revised on a periodic basis and must be kept up to date by the remedial party.

Item #: 484840
Rev Date: 2016-09-09

Installation and Operation Manual

HP/FR Series

Inline Radon Fans

Techical / Customer Support:
Support technique et service à la clientèle
United States / États-Unis Tel.: 800.747.1762 **Canada** Tel.: 800.565.3548

fantech®
a systemair company

Note	Warning / Important note	Information	Technical information	Practical tip

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. Suitable for use with solid-state speed control.

2. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

   g. If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) - protected branch circuit.

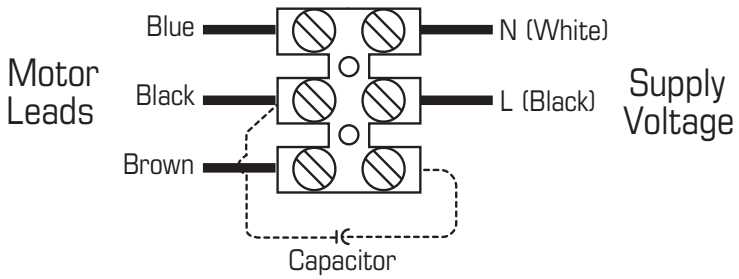
   h. NEVER place a switch where it can be reached from a tub or shower.

3. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

WIRING DIAGRAM



WARRANTY

Five (5) Year Warranty

This warranty supersedes all prior warranties

DURING ENTIRE WARRANTY PERIOD:
Fantech will repair or replace any part which has a factory defect in workmanship or material. Product may need to be returned to the Fantech factory, together with a copy of the bill of sale and identified with RMA number.

FOR FACTORY RETURN YOU MUST:

- Have a Return Materials Authorization (RMA) number. This may be obtained by calling Fantech either in the USA at 1.800.747.1762 or in CANADA at 1.800.565.3548. Please have bill of sale available.
- The RMA number must be clearly written on the outside of the carton, or the carton will be refused.
- All parts and/or product will be repaired/replaced and shipped back to buyer; no credit will be issued.

OR

The Distributor may place an order for the warranty part and/or product and is invoiced. The Distributor will receive a credit equal to the invoice only after product is returned prepaid and verified to be defective.

FANTECH WARRANTY TERMS DO NOT PROVIDE FOR REPLACEMENT WITHOUT CHARGE PRIOR TO INSPECTION FOR A DEFECT. REPLACEMENTS ISSUED IN ADVANCE OF DEFECT INSPECTION ARE INVOICED, AND CREDIT IS PENDING INSPECTION OF RETURNED MATERIAL. DEFECTIVE MATERIAL RETURNED BY END USERS SHOULD NOT BE REPLACED BY THE DISTRIBUTOR WITHOUT CHARGE TO THE END USER, AS CREDIT TO DISTRIBUTOR'S ACCOUNT WILL BE PENDING INSPECTION AND VERIFICATION OF ACTUAL DEFECT BY FANTECH.

THE FOLLOWING WARRANTIES DO NOT APPLY:

- Damages from shipping, either concealed or visible. Claim must be filed with freight company.
- Damages resulting from improper wiring or installation.
- Damages or failure caused by acts of God, or resulting from improper consumer procedures, such as:
    1. Improper maintenance
    2. Misuse, abuse, abnormal use, or accident, and
    3. Incorrect electrical voltage or current.
- Removal or any alteration made on the Fantech label control number or date of manufacture.
- Any other warranty, expressed, implied or written, and to any consequential or incidental damages, loss or property, revenues, or profit, or costs of removal, installation or reinstallation, for any breach of warranty.

WARRANTY VALIDATION

- The user must keep a copy of the bill of sale to verify purchase date.
- These warranties give you specific legal rights, and are subject to an applicable consumer protection legislation. You may have additional rights which vary from state to state.

Limitation of Warranty and Liability

This warranty does not apply to any Fantech product or part which has failed as a result of faulty installation or abuse, incorrect electrical connections or alterations made by others, or use under abnormal operating conditions or misapplication of the product or parts. We will not approve for payment any repair not made by us or our authorized agent without prior written consent. The foregoing shall constitute our sole and exclusive warranty and our sole exclusive liability, and is in lieu of any other warranties, whether written, oral, implied or statutory. There are no warranties which extend beyond the description on the page hereof. In no event, whether as a result of breach of contract, or warranty or alleged negligence, defect incorrect advice or other causes, shall Fantech be liable for special or consequential damages, including, but not limited to, loss of profits or revenue, loss of use of equipment or any other associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, or claims of customers of purchase for such damages. Fantech neither assumes or authorizes any person to assume for it any other liability in connection with the sale of product(s) or part(s). Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages so the above limitations and exclusions may not apply to you.

Warning

Fantech products are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100% free from defects. Even reliable products will experience occasional failures and this possibility should be recognized by the user. If these products are used in a life support ventilation system where failure could result in loss or injury, the user should provide adequate backup ventilation, supplementary natural ventilation, failure alarm system, or acknowledge willingness to accept the risk of such loss or injury.

Fantech reserves the right to make technical changes.
For updated documentation please refer to www.fantech.net

Fantech®

fantech®
a systemair company

INSTALLATION & OPERATING INSTRUCTIONS
Instruction P/N IN015 Rev E
FOR *CHECKPOINT IIa*™ P/N 28001-2 & 28001-3
RADON SYSTEM ALARM

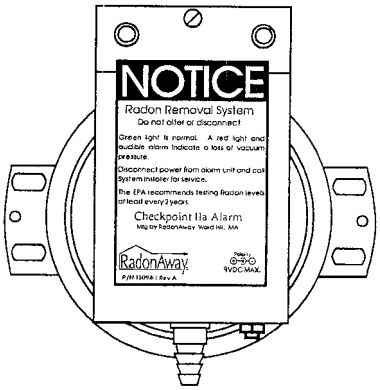
INSTALLATION INSTRUCTIONS
(WALL MOUNTING)

Select a suitable wall location near a vertical section of the suction pipe. The unit should be mounted about four or five feet above the floor and as close to the suction pipe as possible. Keep in mind that with the plug-in transformer provided, the unit must also be within six feet of a 120V receptacle. **NOTE: The Checkpoint IIa is calibrated for vertical mounting, horizontal mounting will affect switchpoint calibration.**

Drill two ¼" holes 4" apart horizontally where the unit is to be mounted.

Install the two ¼" wall anchors provided.

Hang the CHECKPOINT IIa from the two mouting holes located on the mounting bracket. Tighten the mounting screws so the unit fits snugly and securely against the wall.



Drill a 5/16" hole into the side of the vent pipe about 6" higher than the top of the unit.

Insert the vinyl tubing provided about 1" inside the suction pipe.

Cut a suitable length of vinyl tubing and attach it to the pressure switch connector on the CHECKPOINT IIa.

CALIBRATION AND OPERATION.

The CHECKPOINT IIa units are calibrated and sealed at the factory to alarm when the vacuum pressure falls below the factory setting and should not normally require field calibration. Factory Settings are:
28001-2 -.25" WC Vacuum
28001-3 -.10" WC Vacuum

To Verify Operation:

With the exhaust fan off or the pressure tubing disconnected and the CHECKPOINT IIa plugged in, both the red indicator light and the audible alarm should be on.

Turn the fan system on or connect the pressure tubing to the fan piping. The red light and the audible alarm should go off. The green light should come on.

Now turn the fan off. The red light and audible alarm should come on in about two or three seconds and the green light should go out.

WARRANTY INFORMATION

Subject to applicable consumer protection legislation, RadonAway warrants that the CHECKPOINT IIa will be free from defective material and workmanship for a period of (1) year from the date of purchase. Warranty is contingent on installation in accordance with the instructions provided. This warranty does not apply where repairs or alterations have been made or attempted by others; or the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway. All other warranties, expressed or written, are not valid. To make a claim under these limited warranties, you must return the defective item to RadonAway with a copy of the purchase receipt. RadonAway is not responsible for installation or removal cost associated with this warranty. In no case is RadonAway liable beyond the repair or replacement of the defective product FOB RadonAway.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO WARRANTY OF MERCHANTIBILITY. ALL OTHER WARRANTIES, EXPRESSED OR WRITTEN, ARE NOT VALID.

For service under these warranties, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. **No returns can be accepted without an RMA.** If factory return is required, the customer assumes all shipping costs to and from factory.

Manufactured by:
RadonAway
Ward Hill, MA
(978)-521-3703

O&M MANUAL - SVE

The O&M Manual provides protocols for the operation and maintenance of a remedial system. The procedures detailed in the O&M Manual do not replace the manufacturer's documents for specific remedial components but rather supplement such documents and provide for a concise, organized reference document for the remedial system and associated remedial components for operation and maintenance.

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The O&M Manual is to be revised on a periodic basis and must be kept up to date by the remedial party.

Advanced Cleanup Technologies, Inc.

ENVIRONMENTAL CONSULTANTS

Operation & Maintenance Manual

ACT PROJECT NUMBER: 9311-BKNY, August 2018
PROJECT NAME: Soil Vapor Extraction System

337 Berry Street
Brooklyn, NY

Prepared for:

Procidadvanced Cleanup Technologies Inc. 110 Main Street Suite 103 Port Washington, NY 11050

110 Main Street, Suite 103, Port Washington, NY 11050 • Tel: (516) 441-5800 • Fax: (516) 441-5511
Website Address: actenvirons.com

FPZ S.p.A.
Via F.lli Cervi 16
20049 Concorezzo - (MB) - **ITALIA**
Tel. +39 039 69 09 811
Fax +39 039 60 41 296
www.fpz.com

LATERAL CHANNEL BLOWERS - **COMPRESSORS**

SCL K03 / K04 / K05 / K06

MS SERIES - MOR RANGE

SN 1870-7 1/2

TECHNICAL CHARACTERISTICS

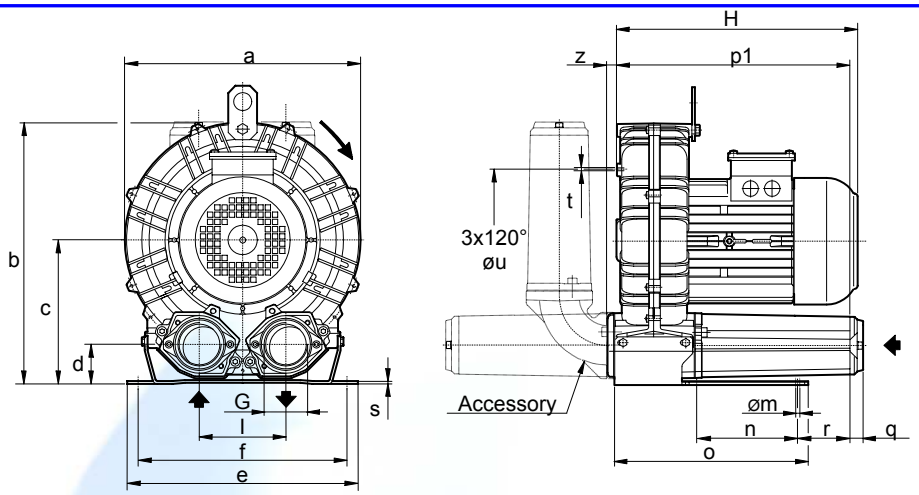
- Aluminium alloy construction
- Smooth operation
- High efficiency impeller
- Maintenance free
- Mountable in any position

OPTIONS

- Special voltages (IEC 38)
- Surface treatments

Possible alternative positions, please refer to drw SI 1835

Dimensions in mm.
Dimensions for reference only



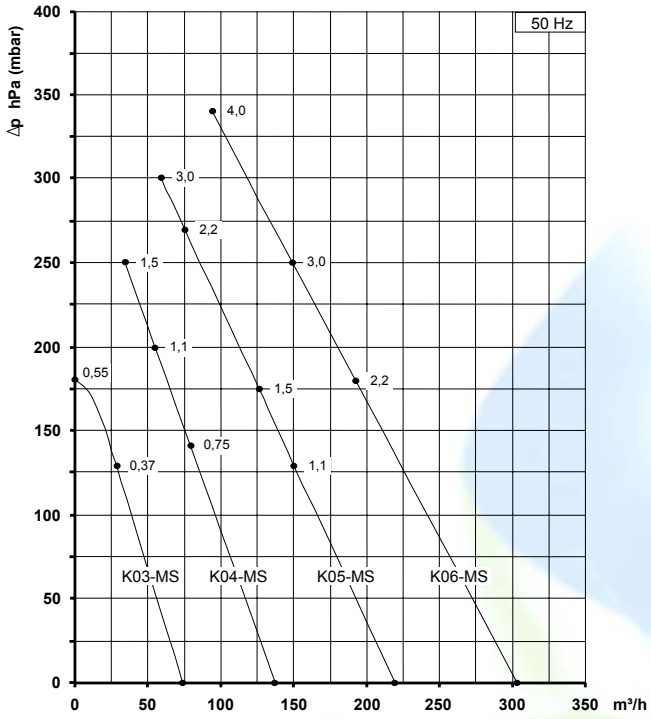
Model	a	b	c	d	e	f	G	l	m	n	o	p1	q	r	s	t	u	z
K03-MS	**241**	**268**	**147**	**43**	**230**	**205**	**G 1" ¼**	**86**	**10**	**83**	**142**	**205**	**18**	**75**	**4**	**M6**	**140**	**12**
K04-MS	**285**	**315**	**172**	**49**	**255**	**225**	**G 1" ½**	**102**	**12**	**95**	**171**	**222**	**18**	**70**	**4**	**M6**	**175**	**18**
K05-MS	**327**	**365**	**200**	**54**	**320**	**260**	**G 2"**	**120**	**15**	**115**	**265**	**320**	**18**	**98**	**4**	**M8**	**200**	**19**
K06-MS	**376**	**393**	**205**	**54**	**325**	**290**	**G 2"**	**125**	**15**	**140**	**272**	**334**	**18**	**85**	**4**	**M8**	**240**	**19**

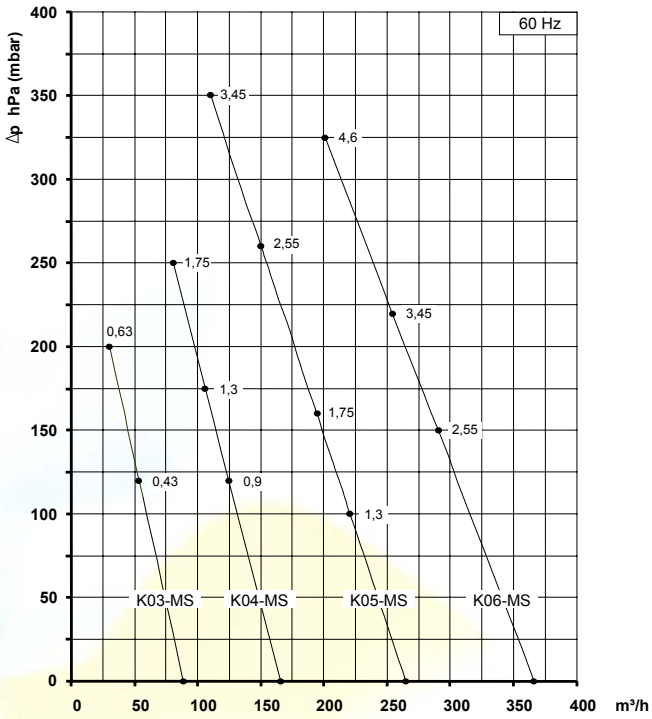
Model	Maximum flow m³/h		Installed power kW		Maximum differential pressure Δp hPa (mbar)		Noise level Lp dB (A) (1)		Overall dimensions H (max)	Weight (max)
	50 Hz 2900 rpm	*60 Hz 3500 rpm*	50 Hz 2900 rpm	*60 Hz 3500 rpm*	50 Hz 2900 rpm	*60 Hz 3500 rpm*	50 Hz 2900 rpm	*60 Hz 3500 rpm*	mm	Kg
K03-MS	**74**	***89***	**0.37**	***0.43***	**130**	***120***	**59.7**	***61.7***	**241**	**11.0**
			0.55	***0.63***	**180**	***200***	**60.0**	***62.0***	**241**	**12.0**
K04-MS	**137**	***166***	**0.75**	***0.9***	**140**	***120***	**62.6**	***64.6***	**282**	**15.8**
			1.1	***1.3***	**200**	***175***	**62.8**	***64.8***	**282**	**16.5**
			1.5	***1.75***	**250**	***250***	**63.0**	***65.0***	**310**	**19.5**
K05-MS	**219**	***265***	**1.1**	***1.3***	**130**	***100***	**68.2**	***70.2***	**307**	**22.5**
			1.5	***1.75***	**175**	***160***	**68.5**	***70.5***	**315**	**23.5**
			2.2	***2.55***	**270**	***260***	**68.8**	***70.8***	**345**	**26.5**
			3.0	***3.45***	**300**	***350***	**69.1**	***71.1***	**375**	**30.5**
K06-MS	**304**	***366***	**2.2**	***2.55***	**180**	***150***	**71.0**	***73.0***	**400**	**31.2**
			3.0	***3.45***	**250**	***220***	**71.3**	***73.3***	**400**	**32.5**
			4.0	***4.6***	**340**	***325***	**71.6**	***73.6***	**400**	**41.0**

(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

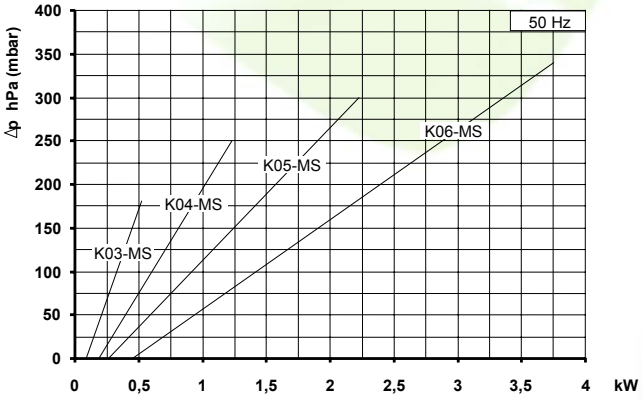
- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from -15° to +40°C.
- Specifications subject to change without notice.

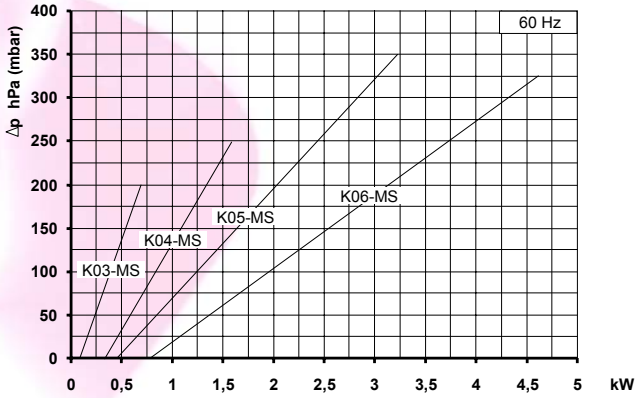
CAPACITY



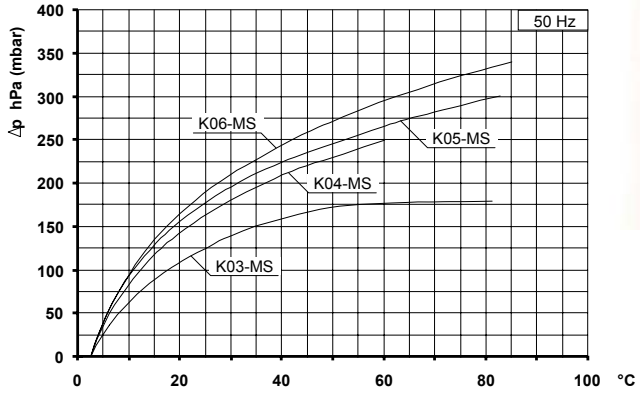


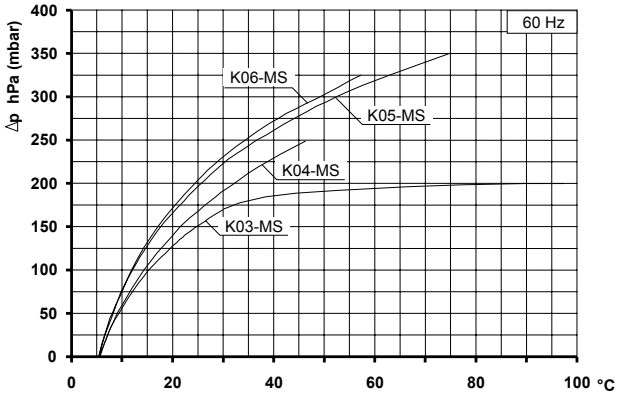
ABSORBED POWER



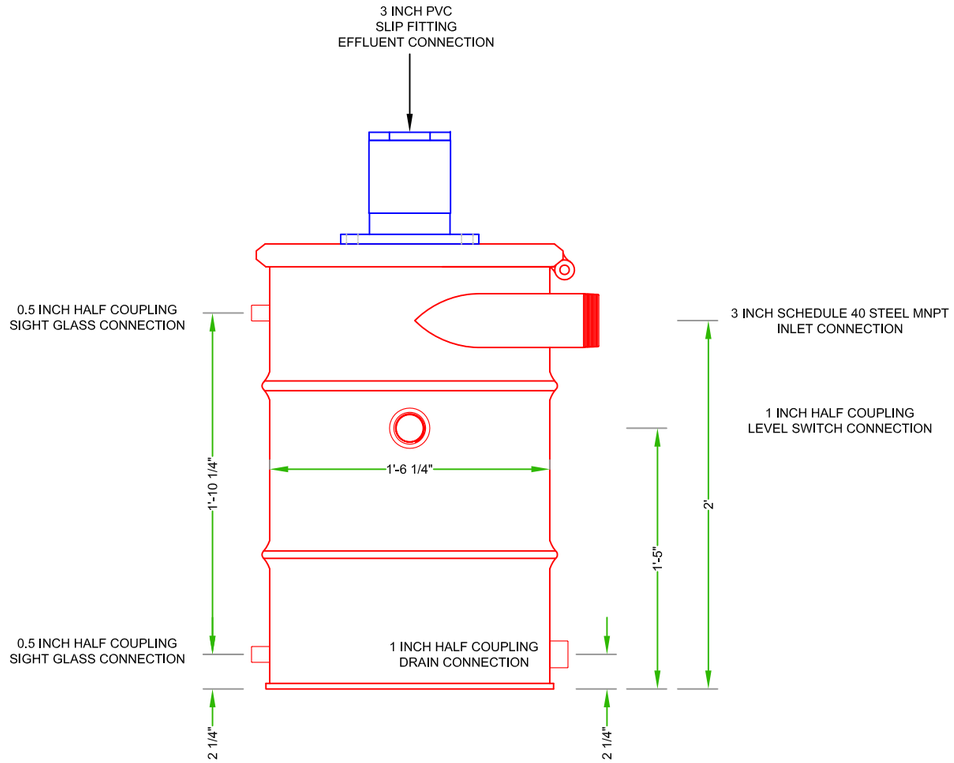


TEMPERATURE INCREASE

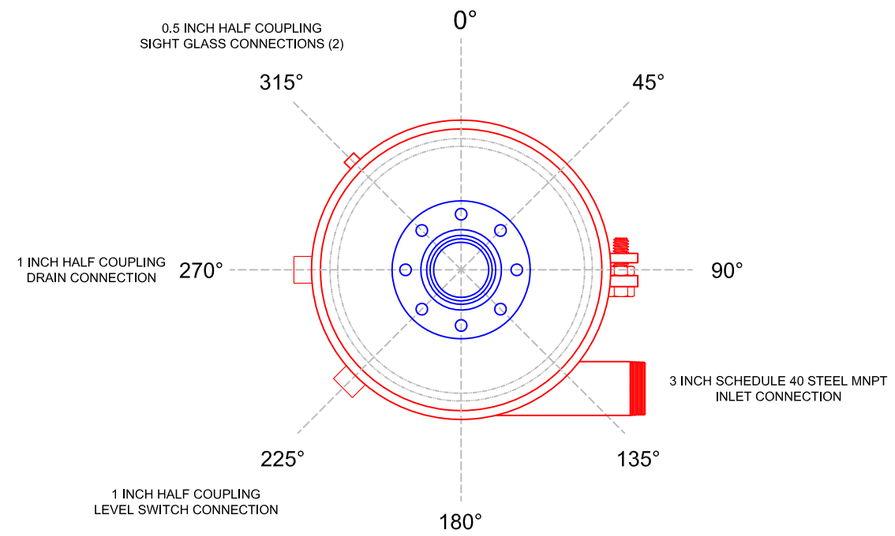




Curves refer to air at 20°C temperature and 1013 mbar (abs) atmospheric pressure measured at inlet port.
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data can change without prior notice.



(VLS-101) SEPARATOR TANK
ELEVATIONAL VIEW



(VLS-101) SEPARATOR TANK
PLAN VIEW

-ESTIMATED WEIGHT: 50 LBS
-E-HIGH LIQUID LEVEL: 19 GALLONS ±
-PUMP OUT CAPACITY: N/A
-ESTIMATED OPERATING WEIGHT: 208 LBS ±

REV	DESCRIPTION	DATE	APPROVED
0	AS BUILT	12-13-16	JAD

REVISIONS

DRWN BY	DATE
JAD	09-21-16
CHK BY	DATE
--	--
APPR BY	DATE
--	--

NES™
NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.COM

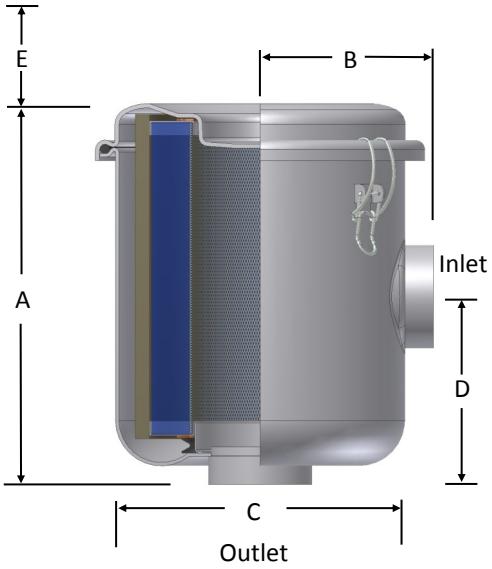
TITLE
30 GALLON VAPOR LIQUID SEPARATOR

ACT 8270 YKNY - YONKERS, NY
VAPOR EXTRACTION EQUIPMENT

JOB NO. 16-221

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	M-2	1 OF 1	0

”L” Style Compact Vacuum Filters
CSL Series 3/8” - 3”



Features

- Seamless drawn housings
- O-ring seal
- Corrosion resistant carbon steel construction
- Powder coat finish
- Stainless steel torsion clips for durability

Technical Specifications

- Vacuum Rating: Medium vacuum service**
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20” H2O over initial Δ P
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

** See Vacuum Filter Technical Data for vacuum service data.

Benefits

- Large dirt holding capacity and easy field cleaning, especially when mounted horizontally or inverted
- Low pressure design

Options

ATEX Available

- Vacuum gauge
- Higher holding capacity configurations available (select models)
- Material/Finishes: stainless steel, epoxy coating
- Support brackets
- Alternative top-to-canister fastening system for low pressure or pulsating systems
- Stainless steel (select models)

Inlet/ Outlet Size	Inlet/ Outlet Type	Assembly SCFM Rating	Housing Config.	Assembly Part Number Polyester	Assembly Part Number Paper	Dimensions - inches A	B	C	D	Suggested Service HT. E	Approx. Wt. lbs	Replacement Element Part No. Polyester	Replacement Element Part No. Paper	Element SCFM Rating
3/8"	BSPP	18	A	CSL-825-039HCB	CSL-824-039HCB	3 3/8	2 1/8	3 3/4	1 13/16	3	0.88	825	824	25
1/2"	NPSC	18	A	CSL-825-050HCB	CSL-824-050HCB	3 1/2	2 1/4	3 3/4	2	3	0.88	825	824	25
1/2"	NPSC	20	B	CSL-843-050HC	CSL-842-050HC	4	3	5 3/4	2 1/2	3	3	843	842	55
3/4"	NPSC	24	A	CSL-825-075HCB	CSL-824-075HCB	3 1/2	2 5/16	3 3/4	2	3	0.88	825	824	25
3/4"	NPSC	25	B	CSL-843-075HC	CSL-842-075HC	4	3	5 3/4	2 1/2	3	3	843	842	55
1"	NPSC	35	B	CSL-843-100HC	CSL-842-100HC	4 1/4	3 1/4	5 3/4	2 5/8	3	3	843	842	55
1"	NPSC	40	C	CSL-849-100HC	CSL-848-100HC	6 11/16	4 1/8	7 3/8	4 1/2	5	5	849	848	115
1 1/4"	NPSC	55	B	CSL-843-125HC	CSL-842-125HC	4 1/4	3 1/4	5 3/4	2 5/8	3	3	843	842	55
1 1/4"	NPSC	60	C	CSL-849-125HC	CSL-848-125HC	6 11/16	4 1/8	7 3/8	4 1/2	5	5	849	848	115
1 1/2"	NPSC	80	C	CSL-849-150HC	CSL-848-150HC	6 3/4	4 1/8	7 3/8	4 1/2	5	5	849	848	115
2"	NPSC	175	D	CSL-851-200HC	CSL-850-200HC	10 1/4	4 1/2	8 3/4	5	9	15	851	850	290
2 1/2"	FPT	210	D	CSL-851-250HC	CSL-850-250HC	10 11/16	5 1/8	8 3/4	5 1/2	9	15	851	850	290
3"	FPT	300	E	CSL-239-300C	CSL-238-300C	15 3/4	8 13/16	13 1/4	8 11/16	11	33	239	238	570

See Vacuum Filter Technical Data section for sizing guidelines.

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

www.solbergmfg.com • sales@solbergmfg.com • Sales: 630.773.1363 • Fax: 630.773.0727

SOLBERG

Inlet Vacuum Filters
Maintenance Manual

www.solbergmfg.com

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com
Rev: MMVF-910

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

Maintenance Manual

SOLBERG Inlet Vacuum Filters

CONTENTS

**For Further Information Please Call: 630-773-1363*

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Rev: MMVF-910

Section A

INTRODUCTION

The purpose of this manual is instruction on the proper assembly and care of Solberg inlet vacuum filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this air filter. Failure to comply could result in explosion, product/system contamination or personal injury.

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable air filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the vacuum inlet filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will exceed your application requirements.

Section B

GENERAL INFORMATION

1. Identification of Solberg Vacuum Inlet Filters.

All Solberg inlet vacuum air filters should have an identification label/nameplate that gives the following information:

Assembly Model #
Replacement Element #

(The exception is OEM supplied units. In this case please enter the OEM part numbers below.)

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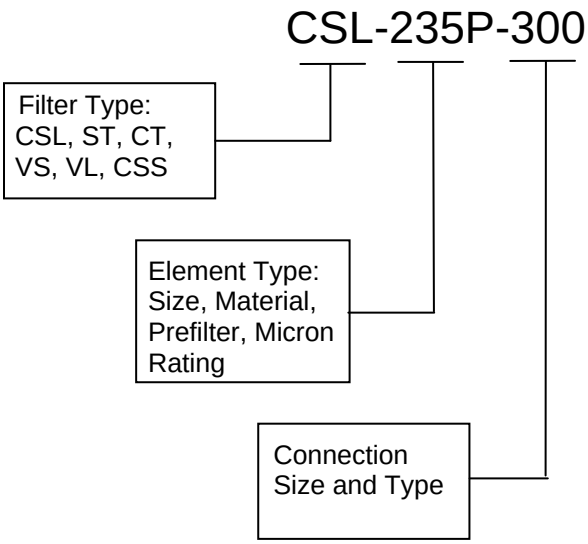
Fill in the actual nameplate data from your new Solberg inlet filter(s):

No.	Filter Model Number	Replacement Element
1		
2		
3		
4		
5		

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'CSL' design filter with a 235 element with prefilter and 3" MPT connection size:



2. Filtration Rules of Thumb

General: For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary

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goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating **with** filtration efficiencies. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95-% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99+% efficiency)	**Environmental Conditions**	**Air to Media Ratio**	
Industrial Grade 2-micron **Paper**	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft^2	$(51m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	15 CFM/ft^2	$(25.5m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 5-micron **Polyester**	Industrial Duty (clean, office/warehouse-like)	50 CFM/ft^2	$(85m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	40 CFM/ft^2	$(68m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft^2	$(42.5m^3/h)/cm^2$
Industrial Grade 1-micron **Polyester**	Severe Duty (Foundry, Construction-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
Industrial Grade 0.3-micron **HEPA** Glass @ 99.97% efficiency	Industrial Duty (clean office/warehouse-like)	10 CFM/ft^2	$(17m^3/h)/cm^2$
	Severe Duty (workshop, factory-like)	7 CFM/ft^2	$(12m^3/h)/cm^2$
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft^2	$(8.5m^3/h)/cm^2$

Table 2

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Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10" to 15" / 250-380mm H_2O from the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m^3/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m^3/h	1 ¼"	60 CFM	102m^3/h	6"	1,100 CFM	1870m^3/h
3/8"	8 CFM	14m^3/h	1 ½"	80 CFM	136m^3/h	8"	1,800 CFM	3060m^3/h
1/2"	10 CFM	17m^3/h	2"	135 CFM	230m^3/h	10"	3,300 CFM	5610m^3/h
3/4"	20 CFM	34m^3/h	2 ½"	195 CFM	332m^3/h	12"	4,700 CFM	7990m^3/h
1"	35 CFM	60m^3/h	3"	300 CFM	510m^3/h	14"	6,000 CFM	10200m^3/h
			4"	520 CFM	884m^3/h			
			5"	800 CFM	1360m^3/h			

Table 3 **Note: This information is for general use only. A qualified engineer must properly design each system.*

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C
Filter Change-Out Differential: 10" to 15" / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
"S" Series Wire Mesh	Epoxy Coated Wire Mesh
"Z" Series Polyester	99+% @ 1 micron
"HE" Series HEPA	99.97% @ 0.3 microns
"U" Series Polyester	99+% @ 25 micron
"W" Series Polyester	99+% @ 100 micron
"S2" Series	Stainless Steel Wire Mesh
"AC" & "ACP" Series	N/A
"Y" Series Polypropylene	99+% @ 5 micron

Table 4

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SOLBERG

Temperature Range: -15° to 385°F / -26° to 196°C
Filter Change-Out Differential: 10” to 15” / 250-380mm H_2O Over Initial Delta P

Media	Micron Rating
“MX” & “MXD” Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. **Element Cleaning - Inlet Filtration**

Solberg elements should be cleaned or replaced, once the pressure drop reaches 15 to 20-inches water column (380 - 500mm WC) above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

WARNING

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 20-inches water column (500mm WC).

Cleaned elements that exceed 20-inches water column (500mm WC) at start-up should be replaced with new elements.

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all

circumstances, the operator should avoid exceeding the manufacturer's recommended maximum pressure drop for their specific equipment.

A. ***Polyester Element***: The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.
B. ***Paper Element***: The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
C. ***Polyurethane Prefilter***: The prefilter may be washed as a sponge or replaced to give the element a longer service life.
D. ***Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements***: Cleaning instructions similar to polyester, except mild solvents may be used.
E. ***Activated Carbon Element***: Not cleanable
F. ***Polypropylene Element***: Cleaning instructions similar to polyester
G. ***Nomex Cloth Element***: Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

Section C

PROCEDURES

1. Installation.

A. Maximum inlet gas stream temperature for most Solberg inlet vacuum filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers.

B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on inlet and outlet ports.

C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting canister top from canister base.

A. ST/CT/Small CSL: Release wire-form clips or loosen wing nut on "claw" bolts.

B. Large CSL: Loosen wing nut or hex head on T-bolts.

C. CSS: Twist upper housing to release.

D. VS/VL: Remove V-clamp by loosening Hex Nut or T-bolt and releasing.

E. Lift off canister top.

3. Removing element for service/maintenance.

A. Remove retaining hex head/wing-nut and washer carefully, and then remove element. Some elements will have a top plate that should also be removed.

B. Clean sealing surfaces of housing, top & base plates, and element endcaps so that they are free of dirt or any other particulate.

WARNING

Failure to comply with these instructions may result in system or pump contamination.

4. Securing Element.

A. Place new or cleaned element evenly on base plate. Be sure element seats properly on base and there is no dirt or particulate present on sealing surfaces.

B. Place top plate (if necessary) on element by centering on tap bolt.

C. Secure washer and wing nut to end cap (or top plate) and tap bolt. Element must be tightly secured. Note: DO NOT over tighten!

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

5. Securing canister top to canister base.

A. Make sure all surfaces are free from dust and other particulate.

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B. Hemisphere o-ring must rest evenly along canister/casting base o-ring groove.

C. ST/CT/Small CSL: Hold canister housing against o-ring or sealing ring on main filter head. Re-fasten wire-form clips or “claw” bolts.

D. Large CSL: Replace housing top plate. Feed T-bolts into corresponding slots and tighten evenly around perimeter. Note: Do NOT over tighten!

E. VS/VL: Secure V-clamp by disconnecting hex nut or T-bolt portion and placing V-clamp along the diameter of canister o-ring groove. Fasten T-bolt and secure tightly. V-CLAMP LEGS MUST REST UNIFORMLY ALONG ENTIRE O-RING GROOVE.

F. CSS: Reassemble top housing to bottom housing by aligning tabs and turning into place.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective air filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10” to 15” / 250-380mm H_2O higher pressure drop above the initial reading. Refer to page 4 for instructions.

2. Always check replacement cartridge gaskets to insure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change from Solberg specified parts!

3. Always check inlets/outlets, element base and its components when replacing element to insure cleanliness. Wipe clean if necessary.

4. Operate only when a proper seal exists.

5. VS/VL: Never operate without absolute assurance that V-clamp is secured correctly along entire diameter of canisters. Check along V-clamp for wear. Replace if any distortion occurs due to handling and usage.

SPARE PARTS

Contact your Solberg Representative for spare part model numbers.

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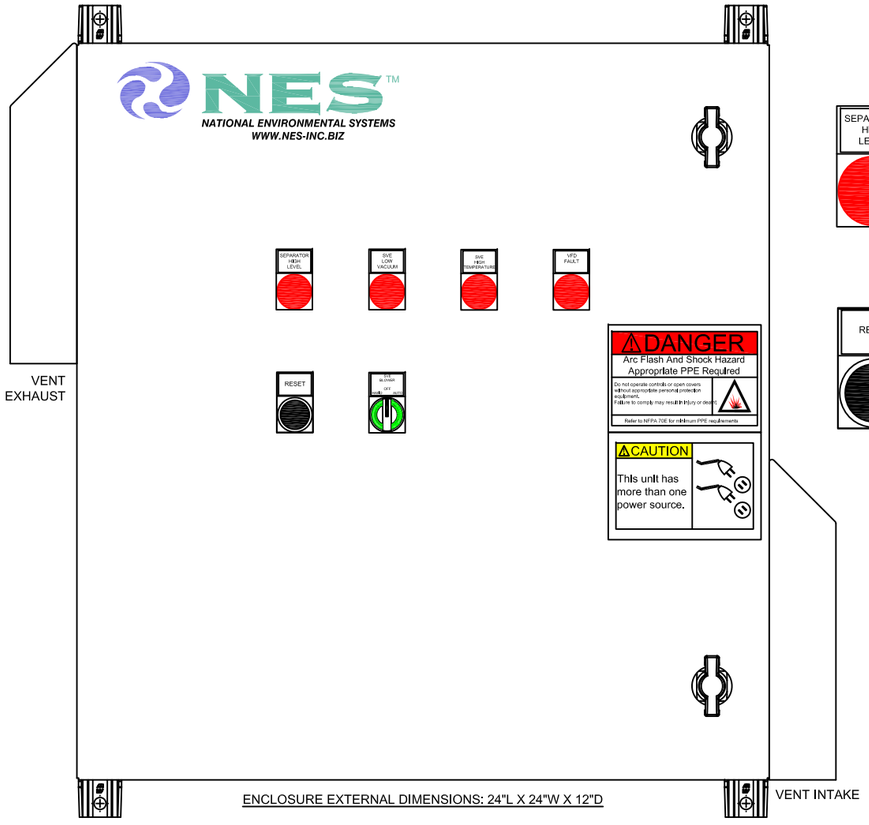
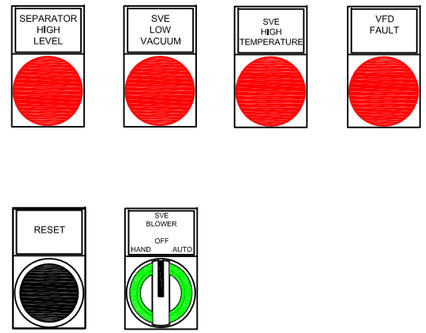
PANEL EXTERIOR

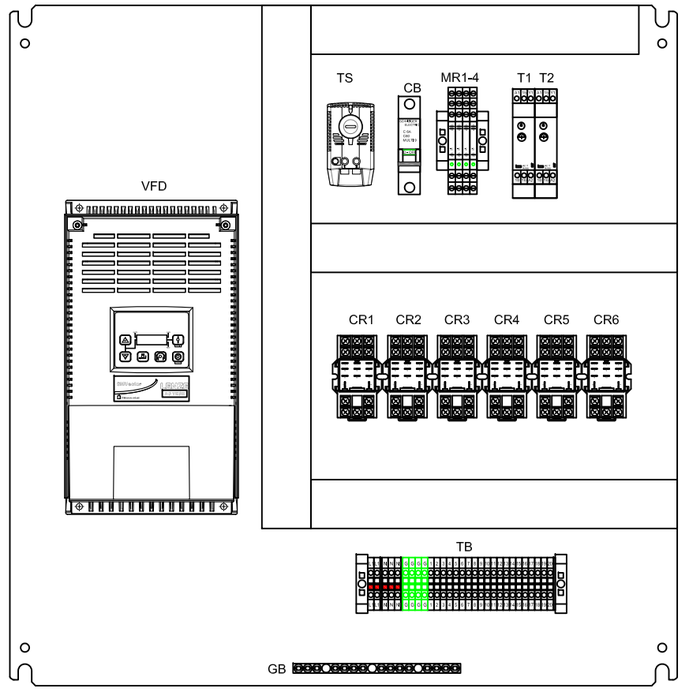


ENCLOSURE EXTERNAL DIMENSIONS: 24"L X 24"W X 12"D

OPERATOR DETAILS



PANEL INTERIOR



LEGEND	
ABBREV.	DESCRIPTION
CB	- CIRCUIT BREAKER
CR	- CONTROL RELAY
GB	- GROUND BAR
MR	- MICRO RELAY
T	- TIMER
TB	- TERMINAL BLOCK
TS	- THERMOSTAT
VFD	- VARIABLE FREQUENCY DRIVE

NOTES
1) REFER TO TABLE 3 FOR BILL OF MATERIALS.
2) LOCAL CONTROL PANEL IS UL 508A LISTED.
3) GROUND IN ACCORDANCE WITH N.E.C. ARTICLE 250.122 & LOCAL AUTHORITY HAVING JURISDICTION.

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	01-16-17	EMB

DRWN BY	RB
DATE	12-15-16
CHK BY	
DATE	
APPR BY	
DATE	

NES
NATIONAL ENVIRONMENTAL SYSTEMS
84 DUNHAM STREET / ATTLEBORO, MA 02703
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

TITLE
CONTROL PANEL LAYOUT DRAWING

ACT 8270 YKNY - YONKERS, NY
VAPOR EXTRACTION EQUIPMENT

JOB NO. 16-221

SCALE	SIZE	DWG NO.	SHEET	REV
NTS	B	I-1	1 OF 1	A

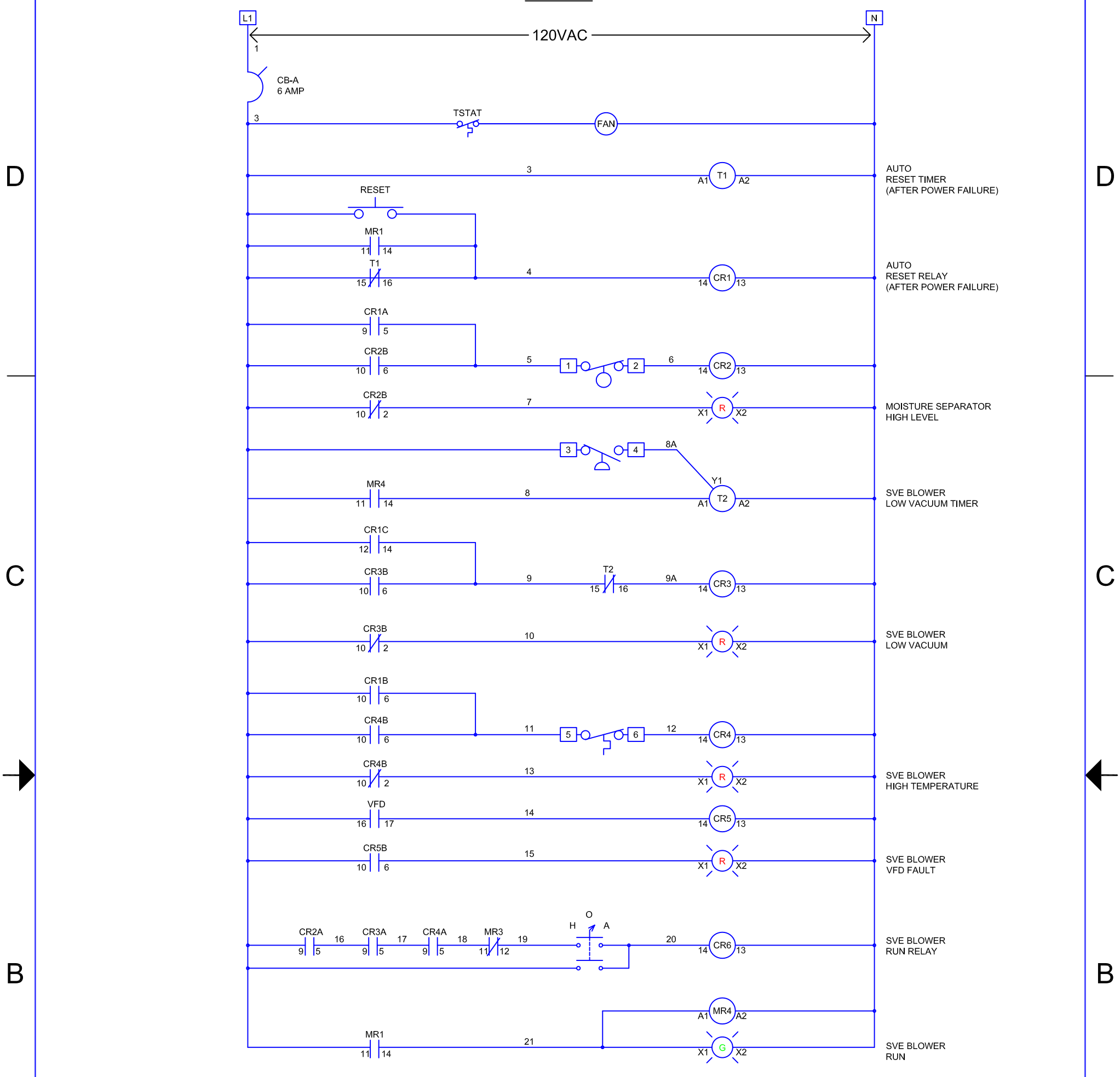
TABLE 3
PANEL BILL OF MATERIALS

REVISION A JANUARY 2017

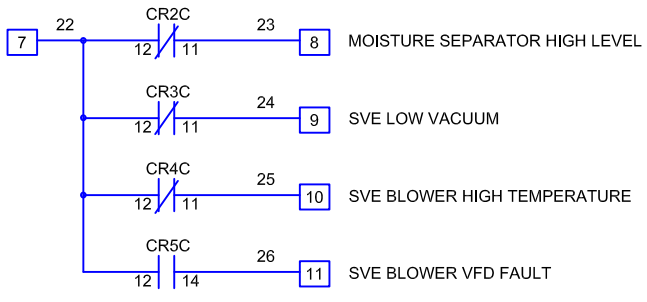
16-221 ACT 8270 YKNY - YONKERS, NY / VAPOR EXTRACTION EQUIPMENT

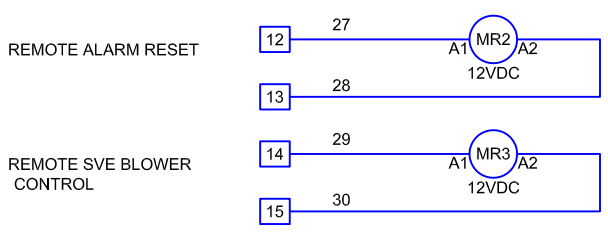
TAG	QUANTITY	ITEM	MODEL	MANUFACTURER
ENCL	1	CONTROL PANEL ENCLOSURE 24 X 24 X 12 - MILD STEEL/GRAY	EN4SD242412GY	HAMMOND
ENCL	1	BACK-PANEL, 24 X 24 - STEEL/WHT	EP2424	HAMMOND
ENCL	1	MOUNTING FEET SET OF 4 - ZINC PLATED	EZPMFHD	HAMMOND
VF	1	VENT FAN 105CFM 115VAC 4.7" W/ FILTER GRILL 24 IN CORD	DNFF120BK115	HAMMOND
VF	1	VENT FAN ADJUSTABLE 30-140F BI-METAL TEMP SWITCH N.O.	SKT011419NO	HAMMOND
VF	2	VENT FAN RAINHOOD NEMA 3R	RH20000GY	HAMMOND
VF	2	VENT FAN GRILL / SOLID COVER KIT	RHA20000G	HAMMOND
CB	1	CIRCUIT BREAKER 6A 1-POLE 120/240 VAC 1-PHASE 10KA DIN-MOUNT	MG24430_	SQUARE D
VFD	1	VFD, 10 HP 208/230VAC 3-PHASE 33 AMPS	ESV752N02TXB	AC TECH
MR1-3	3	RELAY 1 POLE 6-24VDC	RV8H-L-D24	IDEC
MR4	1	RELAY 1 POLE 120VAC	RV8H-L-AD110	IDEC
CR1-6	6	RELAY 3PDT 120VAC W/INDICATOR LIGHT	RH3B-UL-AC 120V	IDEC
CR1-6	6	RELAY SOCKET FOR RH3B	SH3B- 05	IDEC
T	2	TIMER ON-DELAY	RE17RAMU	SQUARE D
PB	6	LEGEND PLATE HOLDER	ZBZ33	SQUARE D
LT	4	PILOT LIGHT HEAD, RED	ZB5AV043	SQUARE D
LT	4	MOUNTING BASE,120V RED PROTECTED LED	ZB5AVG4	SQUARE D
SW	1	PUSH BUTTON OPERATOR NON-ILLUM BLACK	ZB5AA2	SQUARE D
SW	1	3 POSITION SELECTOR SWITCH ILLUM. GREEN MOMENTARY	ZB5AK1733	SQUARE D
SW	1	MOUNTING BASE 120V GREEN PROTECTED LED	ZB5AVG3	SQUARE D
TB	25	TERMINAL BLOCK SCREW CLAMP 20 AMP 600 V GRAY	NSYTRV22	SQUARE D
TB	3	TERMINAL BLOCK END BARRIERS GRAY	NSYTRAC22	SQUARE D
TB	2	TERMINAL BLOCK END ANCHORS	NSYTRAABV35	SQUARE D
GB	1	LOAD CENTER GROUND BAR 15 TERMINALS	PK15GTA	SQUARE D

LADDER LOGIC



DRY CONTACTS FOR CUSTOMER CONNECTION





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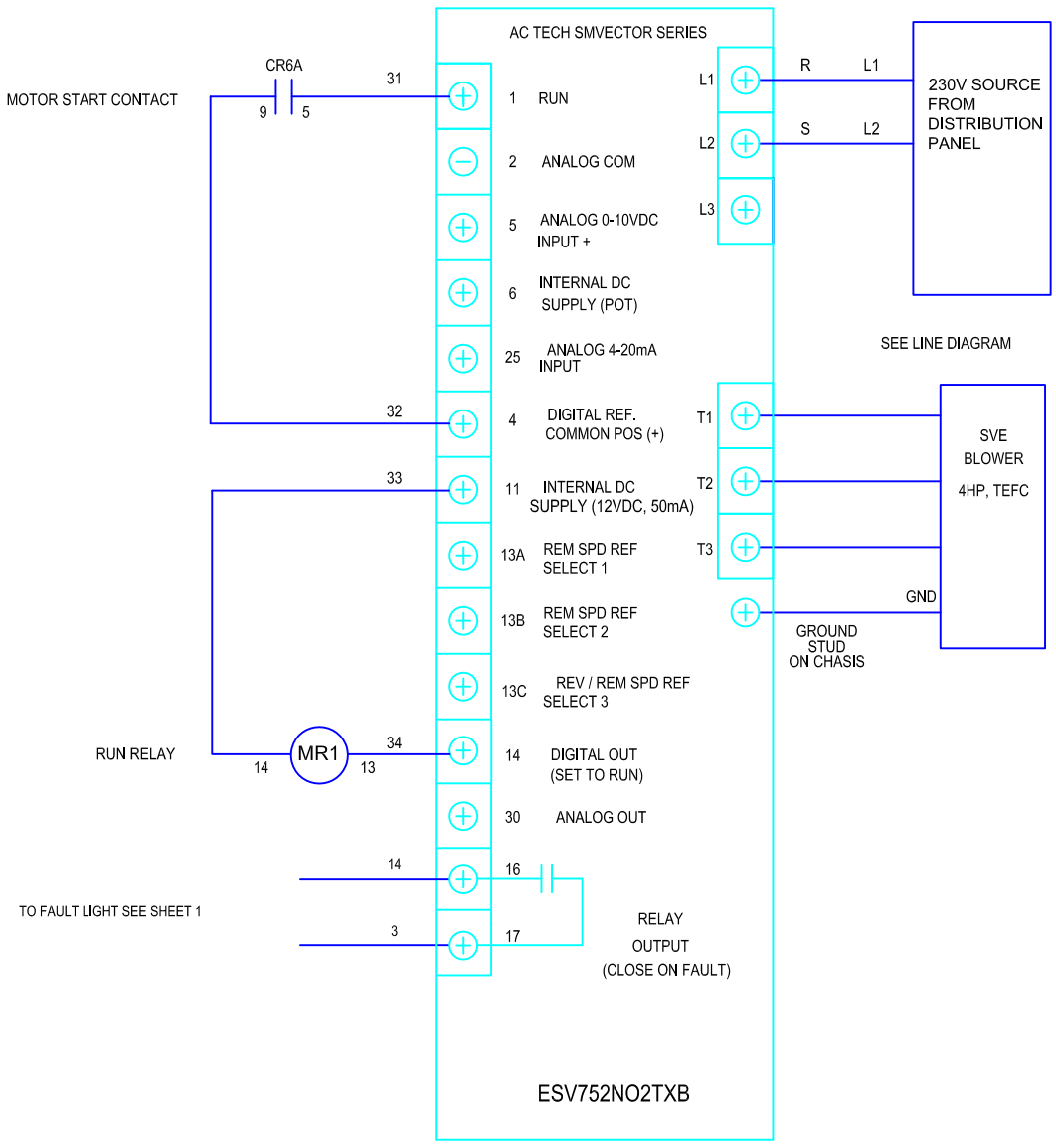
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	01-16-17	EMB

REVISIONS

DRWN BY	DATE	TITLE	
RB	12-15-16	WIRING DIAGRAM	
CHK BY	DATE	ACT 8270 YKNY - YONKERS, NY VAPOR EXTRACTION EQUIPMENT	JOB NO. 16-221
APPR BY	DATE	SCALE N/A / SIZE B / DWG NO. I-2	SHEET 1 OF 3 / REV A

VFD WIRING



REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	01-16-17	EMB

REVISIONS

DRWN BY RB DATE 12-15-16

CHK BY DATE

APPR BY DATE

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WWW.NES-INC.BIZ

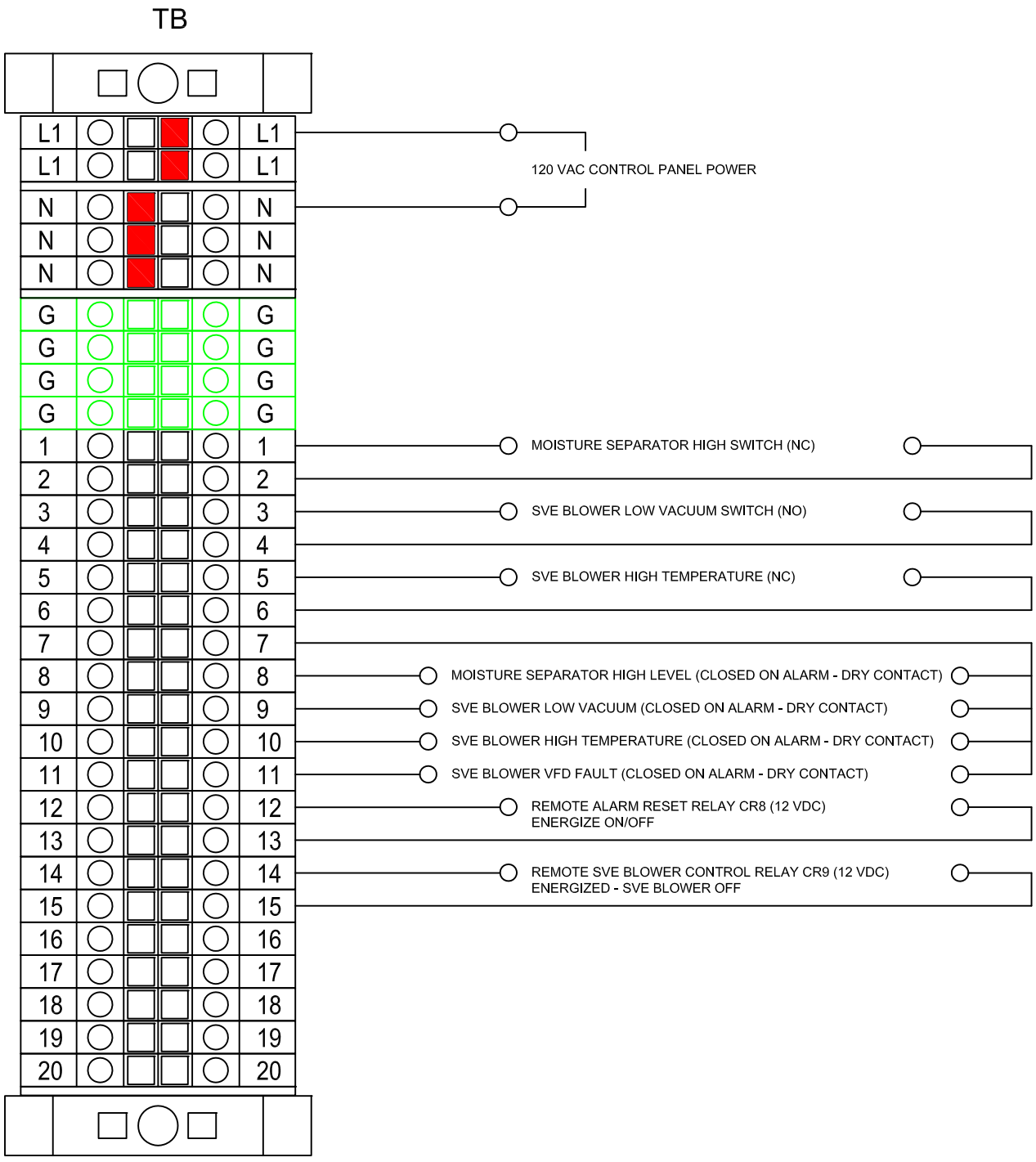
TITLE
WIRING DIAGRAM

ACT 8270 YKNY - YONKERS, NY
VAPOR EXTRACTION EQUIPMENT

JOB NO. 16-221

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	I-2	2 OF 3	A

FIELD WIRING



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	01-16-17	EMB

NATIONAL ENVIRONMENTAL SYSTEMS
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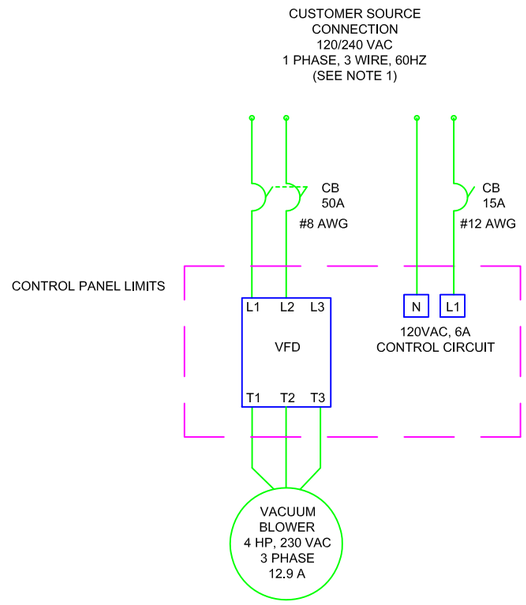
508-226-1100 (Phone) / 508-226-1180 (Fax)
WWW.NES-INC.BIZ

DRWN BY: RB	DATE: 12-15-16	TITLE: WIRING DIAGRAM	
CHK BY	DATE	ACT 8270 YKNY - YONKERS, NY VAPOR EXTRACTION EQUIPMENT	JOB NO. 16-221
APPR BY	DATE	SCALE: N/A / SIZE: B / DWG NO.: I-2	SHEET: 3 OF 3 / REV: A



NOTES:
1. POWER DISTRIBUTION PANEL BRANCH CIRCUIT BREAKERS SUPPLIED AND INSTALLED BY OTHERS.
2. PROCESS BLOWER SUPPLIED AND INSTALLED BY OTHERS
3. VFD USED AS A PHASE CONVERTER.
4. CONTROL PANELS UL508A LISTED
5. GROUND CONDUCTORS NOT SHOWN. INSTALL ALL GROUNDS PER NEC ARTICLES 250.122 , LOCAL ELECTRICAL CODES, AND PER THE AUTHORITY HAVING JURISDICTION.

LEGEND	
ABBREV.	DESCRIPTION
AWG	AMERICAN WIRE GAUGE
CB	CIRCUIT BREAKER
VFD	VARIABLE FREQUENCY DRIVE
— —	CONTROL PANEL LIMITS
———	COSTUMER CONNECTIONS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	AS BUILT	01-16-17	EMB

DRWN BY	RB
DATE	12-15-16
CHK BY	---
DATE	---
APPR BY	---
DATE	---

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TITLE
LINE DIAGRAM

ACT 8270 YKNY - YONKERS, NY
VAPOR EXTRACTION EQUIPMENT

JOB NO. 16-221

SCALE	SIZE	DWG NO.	SHEET	REV
N/A	B	E-1	1 OF 1	A

TABLE 5
AC TECH ESV

VFD SETTINGS
NES 16-221 REVISION A - (JANUARY, 2017)
ACT 8270 YKNY - YONKERS, NY / VAPOR EXTRACTION EQUIPMENT

SETPOINTS LOADED BY NES - VIA VFD INTEGRAL KEYPAD

CODE#	NAME	SELECTION	DESCRIPTION
P100	START CONTROL SOURCE	1	TERMINAL STRIP
P101	STANDARD REFERENCE SOURCE	0	KEYPAD
P102	MINIMUM FREQUENCY	30	Hz
P104	ACCELERATION TIME 1	3	SECONDS
P108	MOTOR OVERLOAD	44	PERCENTAGE 12.9 / 29 = .4448 (44%)
P111	STOP METHOD	0	COAST
P140	RELAY OUTPUT (TB16-17)	4	INVERSE FAULT
P142	TB-14 OUTPUT	1	RUN SIGNAL

PLEASE NOTE: PARAMETERS NOT LISTED REMAIN AT FACTORY DEFAULT

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Type 4 Mild Steel Wallmount Enclosure *Eclipse Series*

Hinge Door with Quarter Turn/Handle

Panel Sold Separately

Application

- Designed to enclose electrical and/or electronic equipment and protect against harsh, industrial environments for wallmount applications.
- Impressive styling features like hidden hinges, attractive latching systems make the Eclipse a suitable addition to any high-tech equipment installation.
- A wide range of sizes and practical accessories make this product line a complete package.

Standards

- UL 508 Type 3R, 4, and 12
- CSA Type 3R, 4, and 12
- Complies with
  - NEMA Type 3R, 4, and 12
  - IEC 60529, IP66

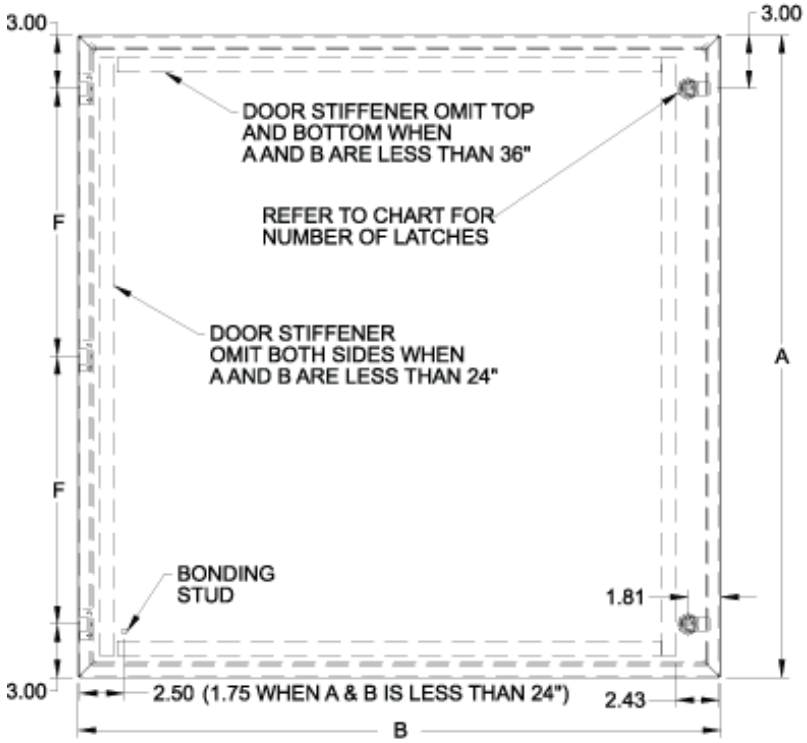
Construction

- Formed 14 or 16 gauge steel.
- Smooth, continuously welded seams ground smooth.
- Door stiffeners are provided where required for increased strength and rigidity - designed to also permit additional mounting options.
- Formed lip on enclosure to exclude flowing liquids and contaminants.
- Door latches feature the added safety of quarter turn slot requiring use of tool for opening.
- Doors may be easily removed for modifications and are interchangeable.
- Seamless poured-in place gasket.
- Collar studs provided for mounting inner panel.
- Includes hardware kit with panel mounting nuts and sealing washers for wall mounting holes.
- Bonding stud provided on door and grounding stud installed in enclosure.
- Hinges are constructed from 304 stainless steel.
- Hinge pins are stainless steel.
- Quarter turn latch and multi-point handle (key lockable) are zinc diecast with black epoxy finish.
- Door alignment guide provided on 36" wide enclosures.

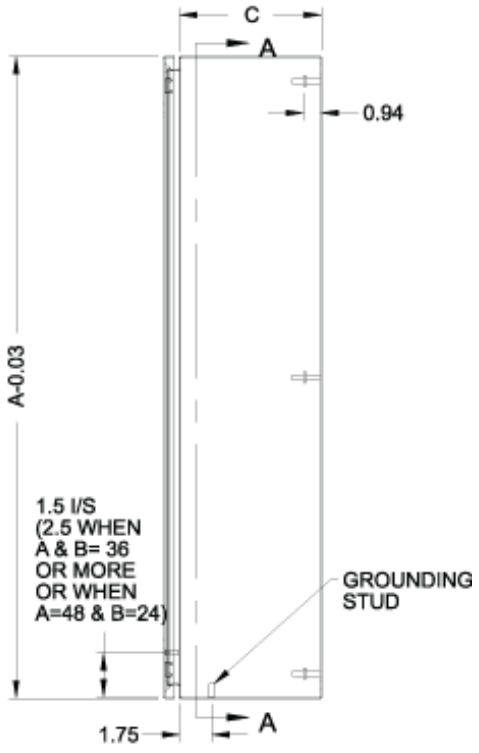
Finish

- Cover and enclosure are phosphatized and finished with a recoatable powder inside and out with choice of ANSI 61 smooth Gray (GY) or RAL7035 textured light gray (LG).

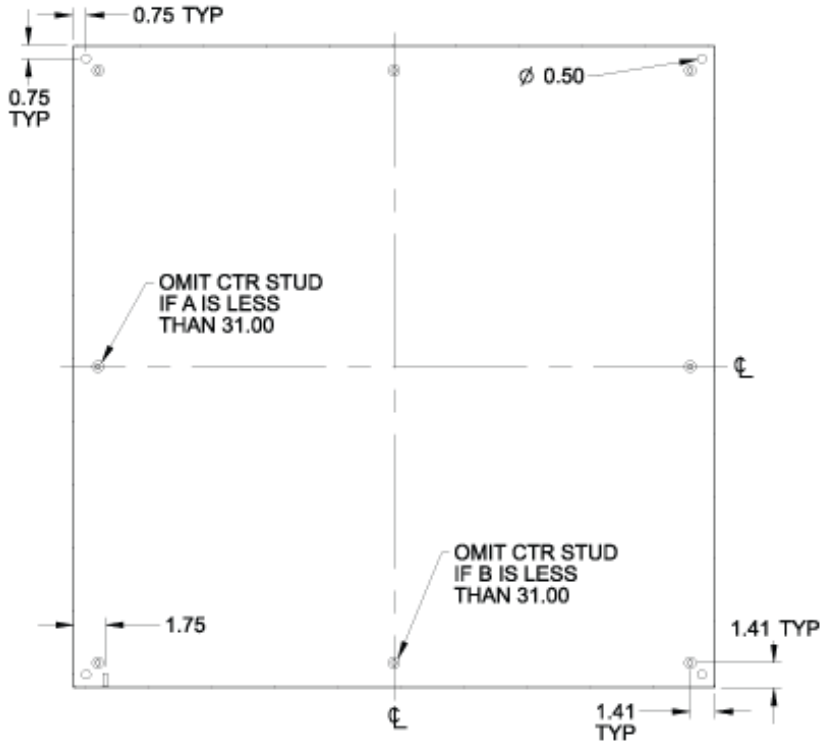
Accessories



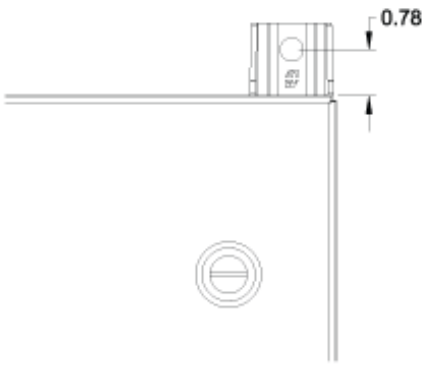
Front View



Side View



SECTION A-A



Mounting Foot Detail

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD12126GY	**EN4SD12126LG**	12.00	12.00	6.00	16	1	Qtr Turn	**EP1212**	10.20	10.20	2	6.00	12
EN4SD12246GY	**EN4SD12246LG**	12.00	24.00	6.00	16	1	Qtr Turn	**EP1224**	10.20	22.20	2	18.00	24
EN4SD16126GY	**EN4SD16126LG**	16.00	12.00	6.00	16	1	Qtr Turn	**EP1612**	14.20	10.20	2	10.00	16
EN4SD16166GY	**EN4SD16166LG**	16.00	16.00	6.00	16	1	Qtr Turn	**EP1616**	14.20	14.20	2	10.00	19
EN4SD16206GY	**EN4SD16206LG**	16.00	20.00	6.00	16	1	Qtr Turn	**EP1620**	14.20	18.20	2	10.00	22
EN4SD20126GY	**EN4SD20126LG**	20.00	12.00	6.00	16	1	Qtr Turn	**EP2012**	18.20	10.20	2	14.00	20

Part No. (ANSI 61 Gray)	Part No. (RAL 7035 Light Gray)	Overall Dimensions A	B	C	Door/Body Gauge	Latches Qty	Type	Opt. Panel Part No.	Panel Size D	E	# Hinges	F	Ship Wt. (lbs)
EN4SD202410GY	**EN4SD202410LG**	20.00	24.00	10.00	16	1	Qtr. Turn	**EP2024**	18.20	22.20	2	14.00	36
EN4SD241210GY	**EN4SD241210LG**	24.00	12.00	10.00	16	1	Qtr Turn	**EP2412**	22.20	10.20	2	18.00	26
EN4SD241610GY	**EN4SD241610LG**	24.00	16.00	10.00	16	1	Qtr. Turn	**EP2416**	22.20	14.20	2	18.00	30
EN4SD242010GY	**EN4SD242010LG**	24.00	20.00	10.00	16	1	Qtr. Turn	**EP2420**	22.20	18.20	2	18.00	36
EN4SD242410GY	**EN4SD242410LG**	24.00	24.00	10.00	14	2	Qtr. Turn	**EP2424**	22.20	22.20	2	18.00	45
EN4SD243010GY	**EN4SD243010LG**	24.00	30.00	10.00	14	2	Qtr. Turn	**EP2430**	22.20	28.20	2	18.00	53
EN4SD302010GY	**EN4SD302010LG**	30.00	20.00	10.00	14	2	Qtr. Turn	**EP3020**	28.20	18.20	3	12.00	47
EN4SD302410GY	**EN4SD302410LG**	30.00	24.00	10.00	14	2	Qtr. Turn	**EP3024**	28.20	22.20	3	12.00	53
EN4SD303010GY	**EN4SD303010LG**	30.00	30.00	10.00	14	2	Qtr. Turn	**EP3030**	28.20	28.20	3	12.00	75
EN4SD362410GY	**EN4SD362410LG**	36.00	24.00	10.00	14	2	Qtr. Turn	**EP3624**	34.20	22.20	3	15.00	70
EN4SD363010GY	**EN4SD363010LG**	36.00	30.00	10.00	14	2	Qtr. Turn	**EP3630**	34.20	28.20	3	15.00	84
EN4SD363610GY	**EN4SD363610LG**	36.00	36.00	10.00	14	2	Qtr. Turn	**EP3636**	34.20	34.20	3	15.00	100
EN4SD423010GY	**EN4SD423010LG**	42.00	30.00	10.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	107
EN4SD423610GY	**EN4SD423610LG**	42.00	36.00	10.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	117
EN4SD482410GY	**EN4SD482410LG**	48.00	24.00	10.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	95
EN4SD483010GY	**EN4SD483010LG**	48.00	30.00	10.00	14	1	3-point	**EP4830**	46.20	28.20	4	14.00	120
EN4SD483610GY	**EN4SD483610LG**	48.00	36.00	10.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	125
EN4SD603610GY	**EN4SD603610LG**	60.00	36.00	10.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	150
EN4SD201612GY	**EN4SD201612LG**	20.00	16.00	12.00	16	1	Qtr Turn	**EP2016**	18.20	14.20	2	14.00	32
EN4SD202012GY	**EN4SD202012LG**	20.00	20.00	12.00	16	1	Qtr Turn	**EP2020**	18.20	18.20	2	14.00	34
EN4SD242012GY	**EN4SD242012LG**	24.00	20.00	12.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	38
EN4SD242412GY	**EN4SD242412LG**	24.00	24.00	12.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	47
EN4SD302412GY	**EN4SD302412LG**	30.00	24.00	12.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	57
EN4SD303012GY	**EN4SD303012LG**	30.00	30.00	12.00	14	2	Qtr Turn	**EP3030**	28.20	28.20	3	12.00	80
EN4SD362412GY	**EN4SD362412LG**	36.00	24.00	12.00	14	2	Qtr Turn	**EP3624**	34.20	22.20	3	15.00	62
EN4SD363012GY	**EN4SD363012LG**	36.00	30.00	12.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	91
EN4SD363612GY	**EN4SD363612LG**	36.00	36.00	12.00	14	2	Qtr Turn	**EP3636**	34.20	34.20	3	15.00	104
EN4SD423012GY	**EN4SD423012LG**	42.00	30.00	12.00	14	1	3-point	**EP4230**	40.20	28.20	4	12.00	111
EN4SD423612GY	**EN4SD423612LG**	42.00	36.00	12.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	121
EN4SD482412GY	**EN4SD482412LG**	48.00	24.00	12.00	14	1	3-point	**EP4824**	46.20	22.20	4	14.00	98
EN4SD483612GY	**EN4SD483612LG**	48.00	36.00	12.00	14	1	3-point	**EP4836**	46.20	34.20	4	14.00	148
EN4SD603612GY	**EN4SD603612LG**	60.00	36.00	12.00	14	1	3-point	**EP6036**	58.20	34.20	4	18.00	165
EN4SD723012GY	**EN4SD723012LG**	72.00	30.00	12.00	14	2	Qtr Turn, 5-point	**EP7230**	70.20	28.20	5	16.50	190
EN4SD723612GY	**EN4SD723612LG**	72.00	36.00	12.00	14	2	Qtr Turn, 5-point	**EP7236**	70.20	34.20	5	16.50	195
EN4SD242016GY	**EN4SD242016LG**	24.00	20.00	16.00	16	1	Qtr Turn	**EP2420**	22.20	18.20	2	18.00	52
EN4SD242416GY	**EN4SD242416LG**	24.00	24.00	16.00	14	2	Qtr Turn	**EP2424**	22.20	22.20	2	18.00	66
EN4SD302416GY	**EN4SD302416LG**	30.00	24.00	16.00	14	2	Qtr Turn	**EP3024**	28.20	22.20	3	12.00	85
EN4SD363016GY	**EN4SD363016LG**	36.00	30.00	16.00	14	2	Qtr Turn	**EP3630**	34.20	28.20	3	15.00	102
EN4SD423616GY	**EN4SD423616LG**	42.00	36.00	16.00	14	1	3-point	**EP4236**	40.20	34.20	4	12.00	140

HAMMOND MANUFACTURING

Quality Products. Service Excellence.

Filter Fan Kits *DNFF Series*

Features

- Kit includes one (1) of the following:
  - Fan
  - Plastic Filter Grill
  - Filter
  - Metal Grill
  - Wire Cord or Leads (see table)
  - Includes Mounting Hardware
- Flame retardant, ABS plastic filter fan grill is molded in a choice of four colors to match our racks & accessories.
  - "BK" (Black)
  - "GY" (ANSI 61 Gray)
  - "LG" (Light Gray - RAL7035)
  - "CG" (Beige)
- Fan is cooled by incoming air.
- Fan component is UL recognized to UL 507, and cUL recognized or CSA certified to CSA-C22.2 No. 113.

Part No. Black Filter Grill	Part No. ANSI 61 Gray Filter Grill	Part No. Gray/Beige Filter Grill	Part No. Light Gray Filter Grill	VAC	Fan Size	CFM	Cord Length
DNFF080BK115	**DNFF080GY115**	**DNFF080CG115**	**DNFF080LG115**	115	3.15	32	11 Inch leads
DNFF120BK115	**DNFF120GY115**	**DNFF120CG115**	**DNFF120LG115**	115	4.70	105	24 Inch cord
DNFF150BK115	**DNFF150GY115**	**DNFF150CG115**	**DNFF150LG115**	115	6.00	230	12 Inch leads
DNFF254BK115	**DNFF254GY115**	**DNFF254CG115**	**DNFF254LG115**	115	10.00	550	24 Inch cord
DNFF080BK230	**DNFF080GY230**	**DNFF080CG230**	**DNFF080LG230**	230	3.15	32	11 Inch leads
DNFF120BK230	**DNFF120GY230**	**DNFF120CG230**	**DNFF120LG230**	230	4.70	105	24 Inch cord
DNFF150BK230	**DNFF150GY230**	**DNFF150CG230**	**DNFF150LG230**	230	6.00	230	12 Inch leads
DNFF254BK230	**DNFF254GY230**	**DNFF254CG230**	**DNFF254LG230**	230	10.00	550	24 Inch cord

Data subject to change without notice

Thermostats *SKT Series*

Features

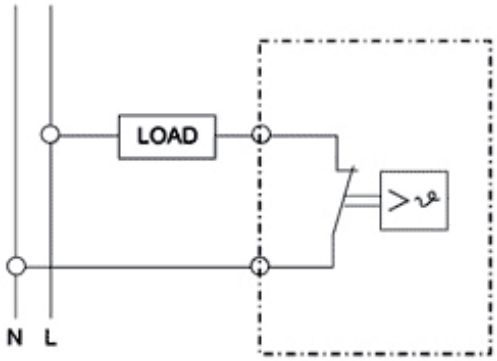
- Designed to provide air temperature control and monitoring in cabinets.
- Thermostat NC (Normally Closed) for the control of heaters and heater fans
- Thermostat NO (Normally Open) for the control of cooling units, or for switching signal transmitters in case of overheating.
- Available in Fahrenheit or Celsius.

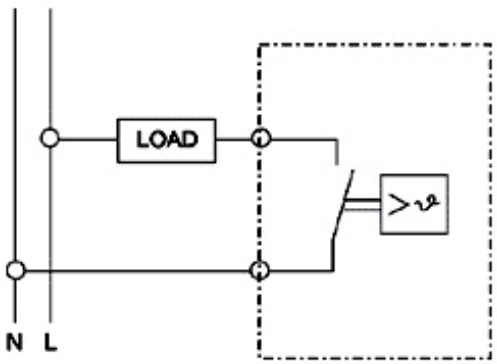
NC - Normally Closed (Red)

- Used in conjunction with heaters.
- Contact opens when rising temperatures reach the set point temperature, shutting heater off.

NO - Normally open (Blue)

- Used in conjunction with fans.
- Contact closes when rising temperatures reach the set point temperature, turning fan on.





Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC	F°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Part No.	Scale	Contact Type	Dimensions Height x Width x Depth	Switching Capacity	Ship Wt. lbs
SKT011409NC-C	C°	Normally Closed	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO	F°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1
SKT011419NO-C	C°	Normally Open	2.8 x 1.5 x 1.4	15 A (1) AC 120 V, 10 A (1) AC 250 V	1

Sensor Element:	Thermostatic bi-metal
Switching difference (hysteresis):	+ or - 4°F (+or- 3°K)
Adjustment Range:	30 - 140°F
Noise Suppression:	N (according to VDE 0875)
Connection:	2 pole terminal for AWG 14 (2.5 mm²)
Mounting:	Easily installed by clip mounting on 35 or 38mm DIN rail (included)
Housing:	Flame retardant plastic UL94VO
Color:	Gray (SB)
Protection:	IP20
Approval:	UL Recognized Component, cUL Recognized Component, CE

Data subject to change without notice

SMV

Frequency Inverter

Operating instructions EN

13465100

Lenze

This document printed in the United States

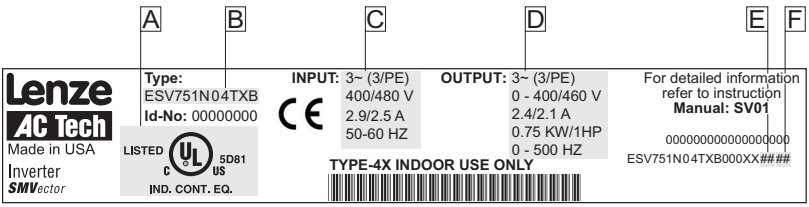
Contents

About These Instructions

This documentation applies to the SMV frequency inverter and contains important technical data regarding the installation, operation, and commissioning of the inverter.

These instructions are only valid for SMV frequency inverters with software revision 4.23 or higher for version 4.23 software, the drive nameplate illustrated below would show “42” in the “F” location.

Please read these instructions in their entirety before commissioning the drive.



A	B	C	D	E	F
Certifications	Type	Input Ratings	Output Ratings	Hardware Version	Software Version

Scope of delivery	Important
• 1 SMV Inverter with EPM installed (see Section 4.4) • 1 Operating Instructions manual	After receipt of the delivery, check immediately whether the items delivered match the accompanying papers. Lenze AC Tech does not accept any liability for deficiencies claimed subsequently. Claim: • visible transport damage immediately to the forwarder. • visible deficiencies /incompleteness immediately to your Lenze AC Tech representative

Related Documents

The documentation listed herein contains information relevant to the operation of the SMVector frequency inverter. To obtain the latest documentation, visit the Technical Library at http://www.lenzeamericas.com.

Document #	Description
CMVINS01	SMVector Communications Module Installation Instruction
CMVMB401	SMVector ModBus RTU over RS485 Communications Reference Guide
CMVLC401	SMVector Lecom Communications Reference Guide
CMVCAN01	SMVector CANopen Communications Reference Guide
CMVDVN01	SMVector DeviceNet Communications Reference Guide
CMVETH01	SMVector EtherNet/IP Communications Reference Guide
CMVPFB01	SMVector PROFIBUS Communications Reference Guide
ALSV01	SMVector Additional I/O Module Installation and Operation Manual
DBV01	SMVector Dynamic Braking
PTV01	SMVector Potentiometer Install Instructions
RKV01	SMVector ESVZXK1 Remote Keypad
RKVU01	SMVector ESVZXH0 Remote Keypad (for NEMA 1 15-60HP (11-45kW) Drives)

1 Safety Information

General

Some parts of Lenze AC Tech controllers can be electrically live and some surfaces can be hot. Non-authorized removal of the required cover, inappropriate use, and incorrect installation or operation creates the risk of severe injury to personnel and/or damage to equipment.

All operations concerning transport, installation, and commissioning as well as maintenance must be carried out by qualified, skilled personnel who are familiar with the installation, assembly, commissioning, and operation of variable frequency drives and the application for which it is being used.

Installation

Ensure proper handling and avoid excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport, handling, installation or maintenance. Do not touch any electronic components or contacts. This drive contains electrostatically sensitive components, which can easily be damaged by inappropriate handling. Static control precautions must be adhered to during installation, testing, servicing and repairing of this drive and associated options. Component damage may result if proper procedures are not followed.

To ensure proper operation, do not install the drive where it is subjected to adverse environmental conditions such as combustible, oily, or hazardous vapors; corrosive chemicals; excessive dust, moisture or vibration; direct sunlight or extreme temperatures.

This drive has been tested by Underwriters Laboratory (UL) and is UL Listed in compliance with the UL508C Safety Standard. This drive must be installed and configured in accordance with both national and international standards. Local codes and regulations take precedence over recommendations provided in this and other Lenze AC Tech documentation.

The SMVector drive is considered a component for integration into a machine or process. It is neither a machine nor a device ready for use in accordance with European directives (reference machinery directive and electromagnetic compatibility directive). It is the responsibility of the end user to ensure that the machine meets the applicable standards.

Electrical Connection

When working on live drive controllers, applicable national safety regulations must be observed. The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, protective earth [PE] connection). While this document does make recommendations in regards to these items, national and local codes must be adhered to.

The documentation contains information about installation in compliance with EMC (shielding, grounding, filters and cables). These notes must also be observed for CE-marked controllers. The manufacturer of the system or machine is responsible for compliance with the required limit values demanded by EMC legislation.

Application

The drive must not be used as a safety device for machines where there is a risk of personal injury or material damage. Emergency Stops, over-speed protection, acceleration and deceleration limits, etc must be made by other devices to ensure operation under all conditions.

The drive does feature many protection devices that work to protect the drive and the driven equipment by generating a fault and shutting the drive and motor down. Mains power variances can also result in shutdown of the drive. When the fault condition disappears or is cleared, the drive can be configured to automatically restart, it is the responsibility of the user, OEM and/or integrator to ensure that the drive is configured for safe operation.

Explosion Proof Applications

Explosion proof motors that are not rated for inverter use lose their certification when used for variable speed. Due to the many areas of liability that may be encountered when dealing with these applications, the following statement of policy applies:

Lenze AC Tech Corporation inverter products are sold with no warranty of fitness for a particular purpose or warranty of suitability for use with explosion proof motors. Lenze AC Tech Corporation accepts no responsibility for any direct, incidental or consequential loss, cost or damage that may arise through the use of AC inverter products in these applications. The purchaser expressly agrees to assume all risk of any loss, cost or damage that may arise from such application.

Operation

Systems including controllers must be equipped with additional monitoring and protection devices according to the corresponding standards (e.g. technical equipment, regulations for prevention of accidents, etc.). The controller may be adapted to your application as described in this documentation.

DANGER!

- After the controller has been disconnected from the supply voltage, live components and power connection must not be touched immediately, since capacitors could be charged. Please observe the corresponding notes on the controller.
- Close all protective covers and doors prior to and during operation.
- Do not cycle input power to the controller more than once every two minutes.
- For SMVector models that are equipped with a Disconnect Switch (11th character in model number is L or M), the Disconnect Switch is intended as a motor service disconnect and does not provide branch circuit protection to the inverter or motor. When servicing the motor, it is necessary to wait 3 minutes after turning this switch to the off position before working on motor power wiring as the inverter stores electrical power. To service the inverter, it is necessary to remove mains ahead of the drive and wait 3 minutes.

Safety Notifications

All safety information given in these Operating Instructions includes a visual icon, a bold signal word and a description.

Signal Word! (characterizes the severity of the danger)
NOTE (describes the danger and informs on how to proceed)

Icon	Signal Word	Meaning	Consequences if ignored
	**DANGER!**	Warns of hazardous electrical voltage.	Death or severe injuries.
	**WARNING!**	Warns of potential, very hazardous situations.	Risk of severe injury to personnel and/or damage to equipment.
	**WARNING! Hot Surface**	Warns of hot surface and risk of burns. Labels may be on or inside the equipment to alert people that surfaces may reach dangerous temperatures.	Risk of severe injury to personnel.
	**STOP!**	Warns of potential damage to material and equipment.	Damage to the controller/drive or its environment.
	**NOTE**	Designates a general, useful note.	None. If observed, then using the controller/drive system is made easier.

Harmonics Notification in accordance with EN 61000-3-2, EN 61000-3-12:

Operation in public supply networks (Limitation of harmonic currents i.a.w. EN 61000-3-2, Electromagnetic Compatibility (EMC) Limits). Limits for harmonic current emissions (equipment input current up to 16A/phase).

Directive	Total Power connected to Mains (public supply)	Additional Measures Required for Compliance (2)
EN 61000-3-2	< 0.5kW	with mains choke
	0.5 ... 1kW	with active filter
	> 1kW	complies without additional measures
EN 61000-3-12	16 ... 75amp	Additional measures are required for compliance with the standard

(1) For compliance with EMC regulations, the permissable cable lengths may change.

(2) The additional measures described only ensure that the controller meets the requirements of the EN 61000-3-2. The machine/system manufacturer is responsible for the machine's compliance with the regulations.

Safety Information in accordance with EN 61800-5-1:

DANGER! - Risk of Electric Shock
Capacitors retain charge for approximately 180 seconds after power is removed. Disconnect incoming power and wait at least 3 minutes before touching the drive.

DANGER! - Risque de choc électrique
Les condensateurs restent sous charge pendant environ 180 secondes après une coupure de courant. Couper l'alimentation et patienter pendant au moins 3 minutes avant de toucher l'entraînement.

WARNING!

- This product can cause a d.c. current in the PE conductor. Where a residual current-operated (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM Type B is allowed on the supply side of this product.
- Leakage Current may exceed 3.5mA AC. The minimum size of the PE conductor shall comply with local safety regulations for high leakage current equipment.
- In a domestic environment, this product may cause radio interference in which case supplementary mitigation measures may be required.

Safety Information in accordance with UL:

Note for UL approved system with integrated controllers: UL warnings are notes which apply to UL systems.
The documentation contains special information about UL.

c UL us
Warnings!

- Integral solid state protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. The use of fuses or circuit breakers is the only approved means for branch circuit protection.
- When protected by CC and T Class Fuses, suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes, at the maximum voltage rating marked on the drive.
- Additionally suitable when protected by a circuit breaker having an interrupting rating not less than 200,000 rms symmetrical amperes, at the maximum voltage rating marked on the drive. (Excludes ESV113xx2T, ESV153xx2T, ESV113xx4T, ESV153xx4T, ESV183xx4T, ESV223xx4T, ESV303xx4T, ESV113xx6T, ESV153xx6T, ESV183xx6T, ESV223xx6T, and ESV303xx6T).
- Use minimum 75°C copper wire only, except for control circuits.
- For control circuits, use wiring suitable for NEC Class 1 circuits only.
- Torque Requirements (in accordance with UL) are listed in section 3.2.1, Power Connections and in 3.2.3, Control terminals
- Shall be installed in a pollution degree 2 macro-environment.
- NEMA 1 (IP31) models shall be installed in a pollution degree 2 macro-environment.
- All models are suitable for installation in a compartment handling Conditioned Air (i.e., plenum rated).

WARNING!
The opening of branch-circuit protective device may be an indication that a fault has been interrupted. To reduce the risk of fire or electric shock, current carrying parts and other components of the controller should be examined and replaced if damaged.

AVERTISSEMENT!
Le déclenchement du dispositif de protection du circuit de dérivation peut être dû à une coupure qui résulte d'un courant de défaut. Pour limiter le risque d'incendie ou de choc électrique, examiner les pièces porteuses de courant et les autres éléments du contrôleur et les remplacer s'ils sont endommagés. En cas de grillage de l'élément traverse par le courant dans un relais de surcharge, le relais tout entier doit être remplacé.

NOTE
Control and communications terminals provide reinforced insulation (i.e. considered SELV or PELV, providing protection in case of direct contact) when the drive is connected to a power system rated up to 300VAC between phase to ground (PE) and the applied voltage on Terminals 16 and 17 is less than 150VAC between phase to ground. Otherwise, control and communications terminals provide basic insulation.

2 Technical Data

2.1 Standards and Application Conditions

Conformity	CE	Low Voltage (2006/95/EC) & EMC (2004/108/EC) Directives
Approvals	UL508C	Underwriters Laboratories -Power Conversion Equipment
Input voltage phase imbalance	≤ 2%	
Supported Power Systems	TT TN	– For central grounded systems, operation is permitted without restrictions. – For corner grounded 400/500V systems, operation is possible but reinforced insulation to control circuits is compromised.
Humidity	≤ 95% non-condensing	
Temperature range	Transport	-25 … +70°C
	Storage	-20 … +70°C
	Operation	-10 … +55°C (with 2.5%/°C current derating above +40°C)
Installation height	0 - 4000m a.m.s.l.	(with 5%/1000 m current derating above 1000m a.m.s.l.)
Vibration resistance	acceleration resistant up to 1.0g	
⚠ **Earth leakage current**	> 3.5 mA to PE	
Max Permissable Cable Length (1)	<= 4.0 Hp (3.0 kW)	30 meters shielded, 60 meters un-shielded
	=> 5.0 Hp (3.7 kW)	50 meters shielded, 100 meters un-shielded.
Enclosure	IP31/NEMA 1	IP65/NEMA 4X
	NEMA 1 and NEMA 4X model enclosures are plenum rated in accordance with UL 508C and are suitable for installation in a compartment handling conditioned air.	
Protection measures against	Earth fault, phase loss, over voltage, under voltage, motor stalling, over temperature motor overload (125% of FLA), short circuit (SCCR=200kA at rated voltage)	
Compliance with EN 61000-3-2 Requirements (2)	< 0.5kW	with mains choke
	0.5 ... 1kW	with active filter
	> 1kW	without additional measures
Compliance with EN 61000-3-12 Requirements (2)	16 ... 75amp	Additional measures required for compliance with EN 61000-3-12

Operation in public supply networks (Limitation of harmonic currents i.a.w. EN 61000-3-2, Electromagnetic Compatibility (EMC) Limits). Limits for harmonic current emissions (equipment input current up to 16A/phase).

(1) The stated cable lengths are permissible at default carrier frequencies (refer to parameter P166).

(2) The additional measures described only ensure that the controller meets the requirements of the EN 61000-3-2. The machine/system manufacturer is responsible for the machine's compliance with the regulations.

2.2 SMV Type Number Designation

The table herein describes the Type numbering designation for the SMVector Inverter models.

ESV	152	N0	2	T	X	B

Electrical Products in the SMVector Series

Power Rating in kW:

251 = 0.25kW (0.33HP)	113 = 11.0kW (15HP)
371 = 0.37kW (0.5HP)	153 = 15.0kW (20HP)
751 = 0.75kW (1HP)	183 = 18.5kW (25HP)
112 = 1.1kW (1.5HP)	223 = 22.0kW (30HP)
152 = 1.5kW (2HP)	303 = 30.0kW (40HP)
222 = 2.2kW (3HP)	373 = 37.5kW (50HP)
302 = 3.0kW (4HP)	453 = 45.0kW (60HP)
402 = 4.0kW (5HP)	
552 = 5.5kW (7.5HP)	
752 = 7.5kW (10HP)	

Installed I/O & Communication Module(s):

C_ = CANopen (Available all models)	The " _ " blank can be:
D_ = DeviceNet (Available all models)	0 = Standard Keypad
E_ = Ethernet/IP, (Available all models)	
R_ = RS-485 / ModBus /Lecom (Avail all models)	
P_ = ProfiBus-DP (Available all models)	
N_ = No Communications installed	

Input Voltage:

1 = 120 VAC (doubler output) or 240 VAC
2 = 240 VAC
4 = 400/480 VAC
6 = 600 VAC

Input Phase:

S = Single Phase Input only
Y = Single or Three Phase Input
T = Three Phase Input only

Input Line Filter

F = Integral EMC Filter
L = Integral EMC Filter and Integrated Disconnect Switch (NEMA 4X/IP65 Models only)
M = Integrated Disconnect Switch (NEMA 4X/IP65 Models only)
X = No EMC Filter/ No Disconnect Switch

Enclosure:

B = NEMA 1/IP31; Indoor only
C = NEMA 4X/IP65; Indoor only; Convection cooled
D = NEMA 4X/IP65; Indoor only; Fan cooled
E = NEMA 4X/IP65; Indoor/Outdoor; Convection cooled
F = NEMA 4X/IP65; Indoor/Outdoor; Fan cooled

NOTE

Prior to installation make sure the enclosure is suitable for the end-use environment

Variables that influence enclosure suitability include (but are not limited to) temperature, airborne contaminates, chemical concentration, mechanical stress and duration of exposure (sunlight, wind, precipitation).

2.3 Ratings

120V / 240VAC Models

Mains = 120V Single Phase (1/N/PE) (90...132V), 240V Single Phase (2/PE) (170...264V); 48...62Hz									
Type	Power		Mains Current		Output Current		Heat Loss (Watts)		
	Hp	kW	120V A	240V A	Cont (I_n) A	Max I %	N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter
ESV251--1S--	0.33	0.25	6.8	3.4	1.7	200	24		
ESV371--1S--	0.5	0.37	9.2	4.6	2.4	200	32	32	
ESV751--1S--	1	0.75	16.6	8.3	4.2	200	52	41	
ESV112--1S--	1.5	1.1	20	10.0	6.0	200	74	74	

NOTES:

Output Current: The Output Current Maximum (%) is a percentage of the Output Current Continuous Amps (In) rating and is adjustable in parameter P171.

240VAC Models

Mains = 240V Single Phase (2/PE) (170...264V); 48...62Hz								
Type	Power		Mains Current	Output Current		Heat Loss (Watts)		
	Hp	kW	240V A	Cont (I_n) A	Max I %	N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter
ESV251--2S--	0.33	0.25	3.4	1.7	200	20		
ESV371--2S--	0.5	0.37	5.1	2.4	200			30
ESV751--2S--	1	0.75	8.8	4.2	200			42
ESV112--2S--	1.5	1.1	12.0	6.0	200			63
ESV152--2S--	2	1.5	13.3	7.0	200			73
ESV222--2S--	3	2.2	17.1	9.6	200			97

240V Single Phase (2/PE) (170...264V), 240V Three Phase (3/PE) (170...264V); 48...62Hz									
Type	Power		Mains Current		Output Current		Heat Loss (Watts)		
	Hp	kW	1~ (2/PE) A	3~ (3/PE) A	Cont (I_n) A	Max I %	N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter
ESV371--2Y--	0.5	0.37	5.1	2.9	2.4	200	27	26	
ESV751--2Y--	1	0.75	8.8	5.0	4.2	200	41	38	
ESV112--2Y--	1.5	1.1	12.0	6.9	6.0	200	64	59	
ESV152--2Y--	2	1.5	13.3	8.1	7.0	200	75	69	
ESV222--2Y--	3	2.2	17.1	10.8	9.6	200	103	93	

240V Three Phase (3/PE) (170...264V); 48...62Hz								
Type	Power		Mains Current	Output Current		Heat Loss (Watts)		
	Hp	kW	240V A	Cont (I_n) A	Max I %	N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter

ESV112--2T--	1.5	1.1	6.9	6	200	64		
ESV152--2T--	2	1.5	8.1	7	200	75		
ESV222--2T--	3	2.2	10.8	9.6	200	103		
ESV402--2T--	5	4.0	18.6	16.5	200	154	139	
ESV552--2T--	7.5	5.5	26	23	200	225	167	
ESV752--2T--	10	7.5	33	29	200	274	242	
ESV113--2T--	15	11	48	42	180	485	468	
ESV153--2T--	20	15	59	54	180	614	591	

NOTES:

Output Current: The Output Current Maximum (%) is a percentage of the Output Current Continuous Amps (In) rating and is adjustable in parameter P171.

400...480VAC Models

400 ... 480V Three Phase (3/PE) (400V: 340...440V), (480V: 340...528V); 48...62Hz											
Type	Power		Mains Current		Output Current				Heat Loss (Watts)		
	Hp	kW	400V A	480V A	Cont (I_n) A		Max I %		N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter
					400V	480V	400V	480V			
ESV371--4T--	0.5	0.37	1.7	1.5	1.3	1.1	175	200	23	21	25
ESV751--4T--	1	0.75	2.9	2.5	2.4	2.1	175	200	37	33	37
ESV112--4T--	1.5	1.1	4.2	3.6	3.5	3.0	175	200	48	42	46
ESV152--4T--	2	1.5	4.7	4.1	4.0	3.5	175	200	57	50	54
ESV222--4T--	3	2.2	6.1	5.4	5.5	4.8	175	200	87	78	82
ESV302--4T--	4	3.0	8.3	7.0	7.6	6.3	175	200			95
ESV402--4T--	5	4.0	10.6	9.3	9.4	8.2	175	200	128	103	111
ESV552--4T--	7.5	5.5	14.2	12.4	12.6	11.0	175	200	178	157	165
ESV752--4T--	10	7.5	18.1	15.8	16.1	14.0	175	200	208	190	198
ESV113--4T--	15	11	27	24	24	21	155	180	418	388	398
ESV153--4T--	20	15	35	31	31	27	155	180	493	449	459
ESV183--4T--	25	18.5	44	38	39	34	155	180	645	589	600
ESV223--4T--	30	22	52	45	46	40	155	180	709	637	647
ESV303--4T--	40	30	68	59	60	52	155	180	1020		
ESV373--4T--	50	37.5	85	74	75	65	155	180	1275		
ESV453--4T--	60	45	100	87	88	77	155	180	1530		

NOTES:

Output Current: The Output Current Maximum (%) is a percentage of the Output Current Continuous Amps (In) rating and is adjustable in parameter P171.

For 400...480 VAC models, the output current maximum (%) in the 400V column is used when P107 = 0
For 400...480 VAC models, the output current maximum (%) in the 480V column is used when P107 = 1

600VAC Models

600V Three Phase (3/PE) (425...660V); 48...62Hz								
Type	Power		Mains Current	Output Current		Heat Loss (Watts)		
	Hp	kW	A	Cont (I_n) A	Max I %	N1/IP31	N4X/IP65 No filter	N4X/IP65 W/ filter
ESV751--6T--	1	0.75	2	1.7	200	37	31	
ESV152--6T--	2	1.5	3.2	2.7	200	51	43	
ESV222--6T--	3	2.2	4.4	3.9	200	68	57	
ESV402--6T--	5	4	6.8	6.1	200	101	67	
ESV552--6T--	7.5	5.5	10.2	9	200	148	116	
ESV752--6T--	10	7.5	12.4	11	200	172	152	
ESV113--6T--	15	11	19.7	17	180	380	356	
ESV153--6T--	20	15	25	22	180	463	431	
ESV183--6T--	25	18.5	31	27	180	560	519	
ESV223--6T--	30	22	36	32	180	640	592	
ESV303--6T--	40	30	47	41	180	930		
ESV373--6T--	50	37.5	59	52	180	1163		
ESV453--6T--	60	45	71	62	180	1395		

NOTES:

Output Current: The Output Current Maximum (%) is a percentage of the Output Current Continuous Amps (In) rating and is adjustable in parameter P171.

STOP!

- For installations above 1000m a.m.s.l., derate I_n by 5% per 1000m, do not exceed 4000m a.m.s.l.
- Operation above 40°C, derate I_n by 2.5% per °C, do not exceed 55°C.

Output Current (In) derating for Carrier Frequency (P166) for NEMA 1 (IP31) Models:
- If P166=2 (8 kHz), derate I_n to 92% of drive rating
- If P166=3 (10 kHz), derate I_n to 84% of drive rating

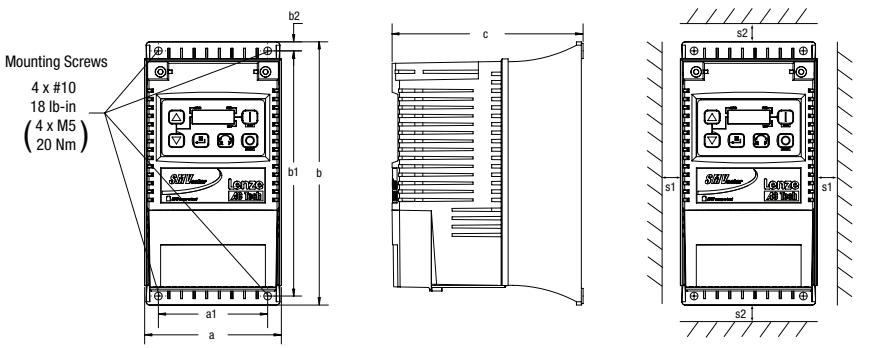
Output Current (In) derating for Carrier Frequency (P166) for NEMA 4X (IP65) Models:
- If P166=1 (6 kHz), derate I_n to 92% of drive rating
- If P166=2 (8 kHz), derate I_n to 84% of drive rating
- If P166=3 (10 kHz), derate I_n to 76% of drive rating

3 Installation

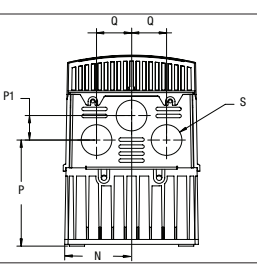
3.1 Dimensions and Mounting

WARNING!
Drives must not be installed where subjected to adverse environmental conditions such as: combustible, oily, or hazardous vapors; corrosive chemicals; excessive dust, moisture or vibration; direct sunlight or extreme temperatures.

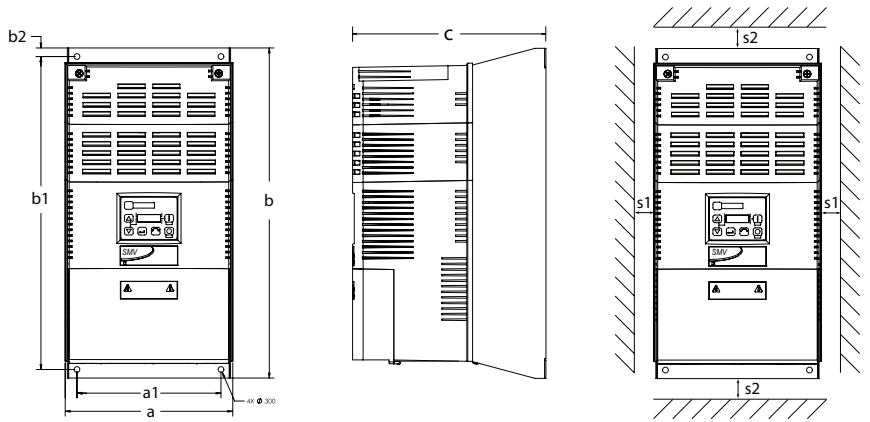
3.1.1 NEMA 1 (IP31) Models ≤ 30HP (22kW)



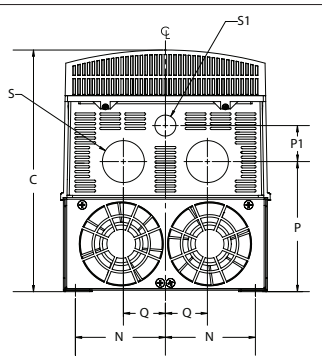
	Type	a in (mm)	a1 in (mm)	b in (mm)	b1 in (mm)	b2 in (mm)	c in (mm)	s1 in (mm)	s2 in (mm)	m lb (kg)
G1	ESV251~~~~~B; ESV371~~~~~B ESV751~~~~~B	3.90 (99)	3.12 (79)	7.48 (190)	7.00 (178)	0.24 (6)	4.35 (111)	0.6 (15)	2.0 (50)	2.0 (0.9)
G2	ESV112~~~~~B; ESV152~~~~~B ESV222~~~~~B	3.90 (99)	3.12 (79)	7.52 (191)	7.00 (178)	0.26 (7)	5.45 (138)	0.6 (15)	2.0 (50)	2.8 (1.3)
G3	ESV402~~~~~B	3.90 (99)	3.12 (79)	7.52 (191)	7.00 (178)	0.30 (8)	5.80 (147)	0.6 (15)	2.0 (50)	3.2 (1.5)
H1	ESV552~~~~~B; ESV752~~~~~B	5.12 (130)	4.25 (108)	9.83 (250)	9.30 (236)	0.26 (7)	6.30 (160)	0.6 (15)	2.0 (50)	6.0 (2.0)
J1	ESV113~~~~~B; ESV153~~~~~B ESV183~~~~~B; ESV223~~~~~B	6.92 (176)	5.75 (146)	12.50 (318)	11.88 (302)	0.31 (8)	8.09 (205)	0.6 (15)	2.0 (50)	13.55 (6.15)

Conduit Hole Dimensions	Type	N in (mm)	P in (mm)	P1 in (mm)	Q in (mm)	S in (mm)
	G1	1.84 (47)	1.93 (49)	.70 (18)	1.00 (25)	.88 (22)
	G2	1.84 (47)	3.03 (77)	.70 (18)	1.00 (25)	.88 (22)
	G3	1.84 (47)	3.38 (86)	.70 (18)	1.00 (25)	.88 (22)
	H1	2.46 (62)	3.55 (90)	.13 (3)	1.38 (35)	1.13 (29) .88 (22)
	J1	3.32 (84)	4.62 (117)	.73 (19)	1.40 (36)	1.31 (33) .88 (22)

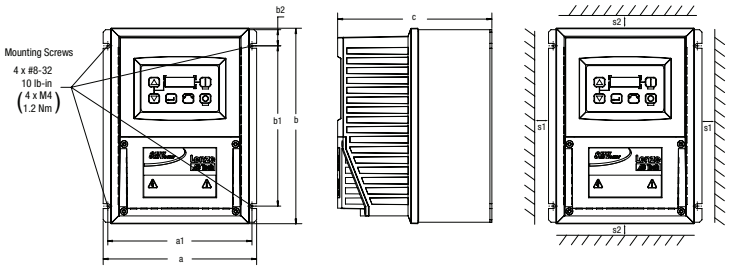
3.1.2 NEMA 1 (IP31) Models > 30HP (22kW)



	Type	a in (mm)	a1 in (mm)	b in (mm)	b1 in (mm)	b2 in (mm)	c in (mm)	s1 in (mm)	s2 in (mm)	m lb (kg)
K1	ESV303~~4~~B; ESV303~~6~~B	8.72 (221)	7.50 (190)	14.19 (360)	13.30 (338)	0.45 (11.4)	10.07 (256)	0.6 (15)	2.0 (50)	24 (10.9)
K2	ESV373~~4~~B; ESV373~~6~~B	8.72 (221)	7.50 (190)	17.19 (436)	16.30 (414)	0.45 (11.4)	10.07 (256)	0.6 (15)	2.0 (50)	31 (14.1)
K3	ESV453~~4~~B ESV453~~6~~b	8.72 (221)	7.50 (190)	20.19 (513)	19.30 (490)	0.45 (11.4)	10.07 (256)	0.6 (15)	2.0 (50)	35 (15.9)

Conduit Hole Dimensions	Type	N in (mm)	P in (mm)	P1 in (mm)	Q in (mm)	S in (mm)	S1 in (mm)
	K1	3.75 (95)	5.42 (137)	1.50 (38.1)	1.75 (44.4)	1.75 (44.4)	0.875 (22.2)
	K2	3.75 (95)	5.42 (137)	1.50 (38.1)	1.75 (44.4)	1.75 (44.4)	0.875 (22.2)
	K3	3.75 (95)	5.42 (137)	1.50 (38.1)	1.75 (44.4)	1.75 (44.4)	0.875 (22.2)

3.1.3 NEMA 4X (IP65) Models

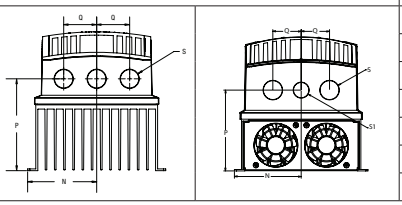


	Type	a in (mm)	a1 in (mm)	b in (mm)	b1 in (mm)	b2 in (mm)	c in (mm)	s1 in (mm)	s2 in (mm)	m lb (kg)
R1	ESV371N01SX_; ESV751N01SX_; ESV371N02YX_; ESV751N02YX_; ESV371N04TX_; ESV751N04TX_; ESV751N06TX_; ESV371N02SF_; ESV751N02SF_; ESV371N04TF_; ESV751N04TF_;	6.28 (160)	5.90 (150)	8.00 (203)	6.56 (167)	0.66 (17)	4.47 (114)	2.00 (51)	2.00 (51)	3.6 (1.63)
R2	ESV112N01SX_; ESV112N02YX_; ESV152N02YX_; ESV112N04TX_; ESV152N04TX_; ESV222N04TX_; ESV152N06TX_; ESV222N06TX_; ESV112N02SF_; ESV152N02SF_; ESV112N04TF_; ESV152N04TF_; ESV222N04TF_; ESV302N04TF_;	6.28 (160)	5.90 (150)	8.00 (203)	6.56 (167)	0.66 (17)	6.31 (160)	2.00 (51)	2.00 (51)	5.9 (2.68)
S1	ESV222N02YX_; ESV222N02SF_	7.12 (181)	6.74 (171)	8.00 (203)	6.56 (167)	0.66 (17)	6.77 (172)	2.00 (51)	2.00 (51)	7.1 (3.24)
T1	ESV552N02TX~; ESV752N02TX~ ESV752N04TX~; ESV752N06TX~; ESV752N04TF~	8.04 (204)	7.56 (192)	10.00 (254)	8.04 (204)	0.92 (23)	8.00 (203)	4.00 (102)	4.00 (102)	10.98 (4.98)
V1	ESV402N02TX_; ESV402N04TX_; ESV552N04TX_; ESV402N06TX_ ESV552N06TX_; ESV402N04TF_; ESV552N04TF_	8.96 (228)	8.48 (215)	10.00 (254)	8.04 (204)	0.92 (23)	8.00 (203)	4.00 (102)	4.00 (102)	11.58 (5.25)
W1	ESV113N02TX~; ESV153N02TX~ ESV113N04TX~; ESV153N04TX~ ESV113N04TF~; ESV153N04TF~ ESV113N06TX~; ESV153N06TX~ ESV183N04TX~; ESV183N04TF~ ESV183N06TX~	9.42 (240)	8.94 (228)	14.50 (368)	12.54 (319)	0.92 (24)	9.45 (241)	4.00 (102)	4.00 (102)	22.0 (10.0)
X1	ESV223N04TX~; ESV223N04TF~ ESV223N06TX~	9.42 (240)	8.94 (228)	18.5 (470)	16.54 (420)	0.92 (24)	9.45 (241)	4.00 (102)	4.00 (102)	25.5 (11.6)

_ = Last digit of part number: C = N4X Indoor (convection cooled) E = N4X In/Outdoor (convection cooled)

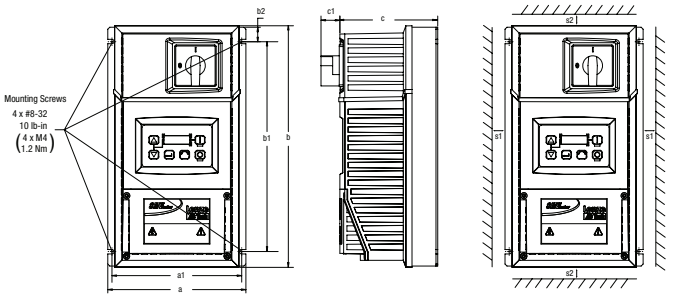
~ = Last digit of part number: D = N4X Indoor (fan cooled) F = N4X In/Outdoor (fan cooled)

Conduit Hole Dimensions



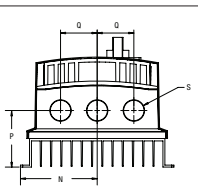
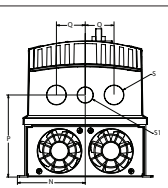
Type	N in (mm)	P in (mm)	Q in (mm)	S in (mm)	S1 in (mm)
R1	3.14 (80)	2.33 (59)	1.50 (38)	.88 (22)	n/a
R2	3.14 (80)	4.18 (106)	1.50 (38)	.88 (22)	n/a
S1	3.56 (90)	4.63 (118)	1.50 (38)	.88 (22)	n/a
T1	4.02 (102)	5.00 (127)	1.85 (47)	1.06 (27)	n/a
V1	4.48 (114)	5.00 (127)	1.85 (47)	1.06 (27)	n/a
W1	4.71 (120)	5.70 (145)	2.00 (51)	1.375 (35)	1.125 (28)
X1	4.71 (120)	5.70 (145)	2.00 (51)	1.375 (35)	1.125 (28)

3.1.4 NEMA 4X (IP65) Models with Disconnect Switch



	Type	a in (mm)	a1 in (mm)	b in (mm)	b1 in (mm)	b2 in (mm)	c in (mm)	c1 in (mm)	s1 in (mm)	s2 in (mm)	m lb (kg)
AA1	ESV371N01SM_; ESV371N02YM_; ESV371N02SL_; ESV371N04TM_; ESV371N04TL_; ESV371N06TM_; ESV751N01SM_; ESV751N02YM_; ESV751N02SL_; ESV751N04TM_; ESV751N04TL_; ESV751N06TM_;	6.28 (160)	5.90 (150)	10.99 (279)	9.54 (242)	0.66 (17)	4.47 (114)	.86 (22)	2.00 (51)	2.00 (51)	4.7 (2.13)
AA2	ESV112N01SM_; ESV112N02YM_; ESV112N02SL_; ESV112N04TM_; ESV112N04TL_; ESV152N02YM_; ESV152N02SL_; ESV152N04TM_; ESV152N04TL_; ESV152N06TM_; ESV222N04TM_; ESV222N04TL_; ESV222N06TM_; ESV302N04TL_;	6.28 (160)	5.90 (150)	10.99 (279)	9.54 (242)	0.66 (17)	6.31 (160)	.86 (22)	2.00 (51)	2.00 (51)	7.9 (3.58)
AD1	ESV222N02SL_; ESV222N02YM_;	7.12 (181)	6.74 (171)	10.99 (279)	9.54 (242)	0.66 (17)	6.77 (172)	.86 (22)	2.00 (51)	2.00 (51)	9.0 (4.08)
AB1	ESV552N02TM~; ESV752N02TM~ ESV752N04TM~; ESV752N06TM~; ESV752N04TL~	8.04 (204)	7.56 (192)	13.00 (330)	11.04 (280)	0.92 (23)	8.00 (203)	.86 (22)	4.00 (102)	4.00 (102)	13.9 (6.32)
AC1	ESV402N02TM_; ESV402N04TM_; ESV552N04TM_; ESV402N06TM_; ESV552N06TM_; ESV402N04TL_; ESV552N04TL_	8.96 (228)	8.48 (215)	13.00 (330)	11.04 (280)	0.92 (23)	8.04 204)	.86 (22)	4.00 (102)	4.00 (102)	14.7 (6.66)
AE1	ESV113N04TM~; ESV153N04TM~, ESV113N06TM~; ESV153N06TM~	9.42 (240)	8.94 (228)	14.50 (368)	12.54 (319)	0.92 (24)	9.45 (241)	0.73 (19)	4.00 (102)	4.00 (102)	23.0 (10.4)
AF1	ESV113N02TM~; ESV153N02TM~ ESV113N04TL~; ESV153N04TL~ ESV183N04TL~; ESV223N04TL~ ESV183N04TM~; ESV223N04TM~ ESV183N06TM~; ESV223N06TM~	9.42 (240)	8.94 (228)	18.5 (470)	16.54 (420)	0.92 (24)	9.45 (241)	0.73 (19)	4.00 (102)	4.00 (102)	28.5 (12.9)

_ = Last digit of part number: C = N4X Indoor (convection cooled) ~ = Last digit of part number: D = N4X Indoor (fan cooled)

Conduit Hole Dimensions		Type	N in (mm)	P in (mm)	Q in (mm)	S in (mm)	S1 in (mm)
		AA1	3.14 (80)	2.33 (59)	1.50 (38)	.88 (22)	n/a
		AA2	3.14 (80)	4.18 (106)	1.50 (38)	.88 (22)	n/a
		AD1	3.56 (90)	4.63 (118)	1.50 (38)	.88 (22)	n/a
		AB1	4.02 (102)	5.00 (127)	1.85 (47)	1.06 (27)	n/a
		AC1	4.48 (114)	5.00 (127)	1.85 (47)	1.06 (27)	n/a
		AE1	4.71 (120)	5.70 (145)	2.00 (51)	1.375 (35)	1.125 (28)
		AF1	4.71 (120)	5.70 (145)	2.00 (51)	1.375 (35)	1.125 (28)

3.2 Electrical Installation

Installation After a Long Period of Storage

STOP!

Severe damage to the drive can result if it is operated after a long period of storage or inactivity without reforming the DC bus capacitors.

If input power has not been applied to the drive for a period of time exceeding three years (due to storage, etc), the electrolytic DC bus capacitors within the drive can change internally, resulting in excessive leakage current. This can result in premature failure of the capacitors if the drive is operated after such a long period of inactivity or storage.

In order to reform the capacitors and prepare the drive for operation after a long period of inactivity, apply input power to the drive for 8 hours prior to actually operating the motor.

3.2.1 Power Connections

STOP!

If the kVA rating of the AC supply transformer is greater than 10 times the input kVA rating of the drive(s), an isolation transformer or 2-3% input line reactor must be added to the line side of the drive(s).

DANGER! Hazard of electrical shock!

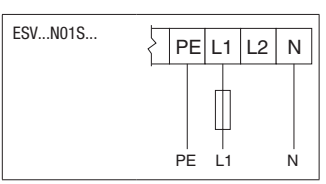
Circuit potentials up to 600 VAC are possible. Capacitors retain charge after power is removed. Disconnect power and wait at least three minutes before servicing the drive.

STOP!

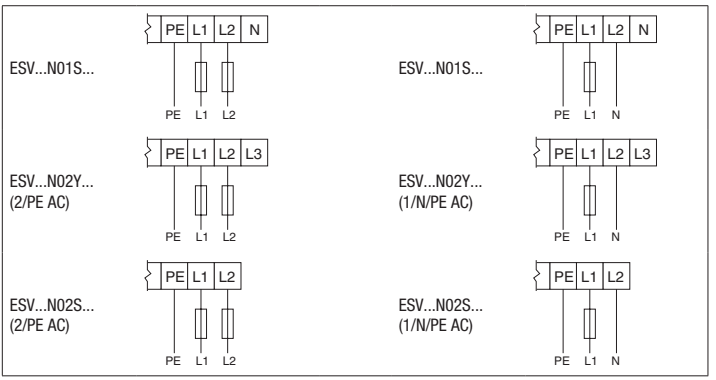
- Verify mains voltage before connecting to drive.
- Do not connect mains power to the output terminals (U,V,W)! Severe damage to the drive will result.
- Do not cycle mains power more than once every two minutes. Damage to the drive may result.

Mains and Motor Terminations		
Type	**Torque**	**Strip Length**
<5HP	12 lb-in (1.3 Nm)	5/16 in (8mm)
ESV552xx2T, ESV752xx2T, ESV113xx4/6, ESV153xx4/6, ESV183xx6, ESV223xx6	16 lb-in (1.8 Nm)	5/16 in (8mm)
ESV552xx4Txx, ESV752xx4Txx, ESV552xx6Txx, ESV752xx6Txx	12 lb-in (1.3Nm)	0.25 in (6mm)
ESV113xx2xxx, ESV153xx2xxx, ESV183xx4xxx, ESV223xx4xxx, ESV303xx4xxx	24 lb-in (2.7 Nm)	7/16 in (10mm)
ESV373xx4xxx, ESV453xx4xxx	27 lb-in (3.05 Nm)	0.75 in (19mm)
Torque: N4X/IP65 Door Screws		
N4X/IP65	6-7 lb-in (0.67-0.79 Nm)	0.25 in (6mm)

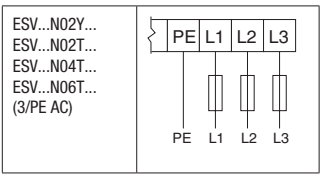
3.2.1.1 Mains Connection to 120VAC Single-Phase Supply



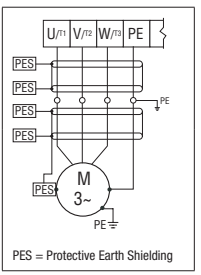
3.2.1.2 Mains Connection to 240VAC Single-Phase Supply



3.2.1.3 Mains Connection to Three-Phase Supply



3.2.1.4 Motor Connection



WARNING!
If the cable connection between the drive and the motor has an in-line contactor or circuit breaker then the drive must be stopped prior to opening/closing the contacts. Failure to do so may result in Overcurrent trips and/or damage to the inverter.

WARNING!
Leakage current may exceed 3.5 mA AC. The minimum size of the protective earth (PE) conductor shall comply with local safety regulations for high leakage current equipment.

STOP!
In the case of a Spinning Motor:

To bring free-wheeling loads such as fans to a rest before starting the drive, use the DC injection braking function. Starting a drive into a freewheeling motor creates a direct short-circuit and may result in damage to the drive.

Confirm motor suitability for use with DC injection braking.
Consult parameter P110 for starting / restarting into spinning motors.

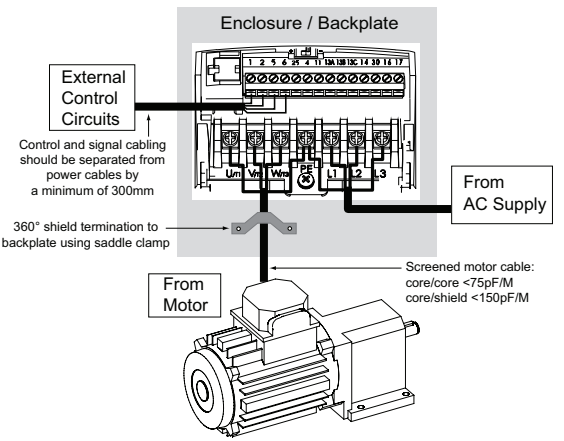
3.2.1.5 Installation Recommendations for EMC Compliance

For compliance with EN 61800-3 or other EMC standards, motor cables, line cables and control or communications cables must be shielded with each shield/screen clamped to the drive chassis. This clamp is typically located at the conduit mounting plate.

The EMC requirements apply to the final installation in its entirety, not to the individual components used. Because every installation is different, the recommended installation should follow these guidelines as a minimum. Additional equipment (such as ferrite core absorbers on power conductors) or alternative practices may be required to meet conformance in some installations.

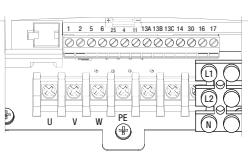
Motor cable should be low capacitance (core/core <75pF/m, core/shield <150pF/m). Filtered drives can meet the class A limits of EN 55011 and EN 61800-3 Category 2 with this type of motor cable up to 10 meters.

NOTE: Refer to Appendix A for recommended cable lengths. Any external line filter should have its chassis connected to the drive chassis by mounting hardware or with the shortest possible wire or braid.

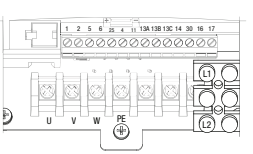


3.2.1.6 NEMA 4X (IP65) Input Terminal Block

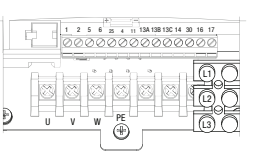
For NEMA 4X (IP65) models with integrated EMC filter and/or integrated line disconnect, the input terminal block is located on the right-hand side of the SMV inverter in the NEMA 4 X (IP65) enclosure. The single and three phase models are illustrated herein. Refer to paragraph 3.2.3 Control Terminals for pin out information.



Single Phase (2/PE) 120/240 VAC models (ESVxxxN01SMC) with integrated line disconnect



Single Phase (2/PE) 240 VAC models with Filter and/or integrated line disconnect

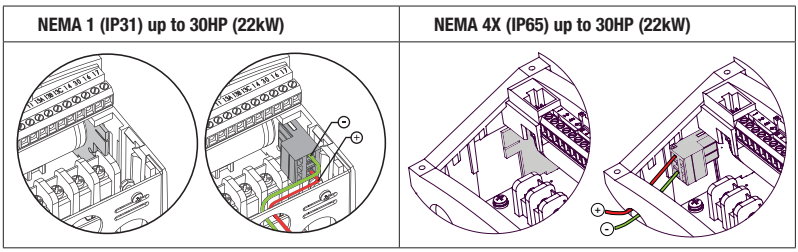


Three Phase (3/PE) models with Filter and/or integrated line disconnect

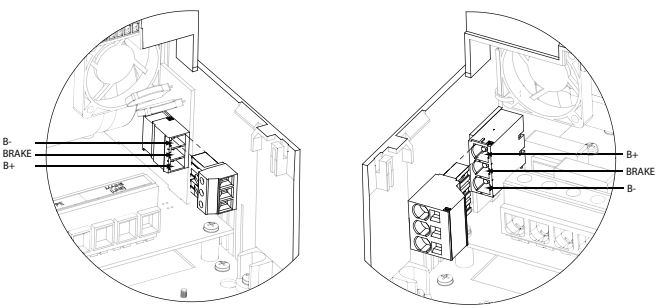
WARNING
Power remains present for up to 3 minutes on power input terminals (L1, L2 and L3) and output terminals (U, V and W) even when the disconnect switch is in the OFF position. Remove input power ahead of the drive and wait 3 minutes before removing the terminal cover.

3.2.1.7 Dynamic Brake Connections

For NEMA 1 and NEMA 4X Drives rated up to 30HP (22kW) the Dynamic Brake connections are made as illustrated herein. Refer to the SMV Dynamic Brake Instructions (DBV01) for complete information.



The SMV 40...60Hp (30...45kW) models include a dynamic brake transistor as standard and only require the connection of an external resistor kit for dynamic braking operation. The dynamic brake resistor connections for 40...60 Hp (30...45kW) drives are standard built-in connections as illustrated in the diagram below. In the 40Hp (30kW) model drives, the dynamic brake connector is on the right-hand side of the drive and the terminals from top to bottom are B-, BRAKE and B+. In the 50/60HP (37.5/45 kW) model drives, the dynamic brake connector is on the left-hand side of the drive and the terminals from top to bottom are B+, BRAKE and B-.



40HP (30kW) 50/60HP (37.5/45kW)

External resistor kits must be connected to terminals B+ and BRAKE (no connection to B-). Refer to the table herein for external resistor kit selection. Refer to parameter P189 for enabling the dynamic brake function in the 40...60Hp (30...45kW) models.

400/480 VAC SMV Inverter			Resistor Kit			
Type	**Hp**	**kW**	**Resistance (Ω)**	**Power (W)**	**Catalog #**	**SAP#**
ESV303**4T**	40	30	23.5	1020	841-013	13317724
ESV373**4T**	50	37	17	1400	841-015	13317626
ESV453**4T**	60	45	17	1400	841-015	13317626
600 VAC SMV Inverter			**Resistor Kit**			
Type	**Hp**	**kW**	**Resistance (Ω)**	**Power (W)**	**Catalog #**	**SAP#**
ESV303**6T**	40	30	35	1070	841-014	13317624
ESV373**6T**	50	37	24	1560	841-016	13317628
ESV453**6T**	60	45	24	1560	841-016	13317628

3.2.2 Fuses/Cable Cross-Sections

NOTE: Observe local regulations. Local codes may supersede these recommendations

WARNING: Use a FUSE * for 240V drives requiring > 40A protection and for 400/480/600V drives requiring >32A protection.

Type		Recommendations				
		Fuse	Miniature circuit breaker[1]	Fuse [2]* or Breaker [3] (N. America)	Input Power Wiring (L1, L2, L3, PE)	
					[mm²]	[AWG]
120V 1~ (1/N/PE)	ESV251N01SXB	M10 A	C10 A	10 A	1.5	14
	ESV371N01SXB, ESV371N01SX*	M16 A	C16 A	15 A	2.5	14
	ESV751N01SXB, ESV751N01SX*	M25 A	C25 A	25 A	4	10
	ESV112N01SXB, ESV112N01SX*	M32 A	C32 A	30A	4	10
240V 1~ (2/PE)	ESV251N01SXB, ESV251N02SXB, ESV371N01SXB, ESV371N02YXB, ESV371N02SF*	M10 A	C10 A	10 A	1.5	14
	ESV751N01SXB, ESV751N02YXB, ESV751N02SF*	M16 A	C16 A	15 A	2.5	14
	ESV112N02YXB, ESV112N02SFC, ESV112N01SXB ESV112N01SX*	M20 A	C20 A	20 A	2.5	12
	ESV152N02YXB, ESV152N02SF*	M25 A	C25 A	25 A	2.5	12
	ESV222N02YXB, ESV222N02SF*	M32 A	C32A	30 A	4	10
240V 3~ (3/PE)	ESV371N02YXB, ESV751N02YXB, ESV371N02Y_*, ESV751N02Y_*	M10 A	C10 A	10 A	1.5	14
	ESV112N02YXB, ESV152N02YXB, ESV112N02TXB, ESV152N02TXB, ESV112N02Y_*, ESV152N02Y_*	M16 A	C16 A	12 A	1.5	14
	ESV222N02YXB, ESV222N02TXB, ESV222N02YX*	M20 A	C20 A	20 A	2.5	12
	ESV402N02TXB, ESV402N02T_*	M32 A	C32 A	30 A	4.0	10
	ESV552N02TXB, ESV552N02T_~	M40 A	C40 A	35 A	6.0	8
	ESV752N02TXB, ESV752N02T_~	M50 A	* use Fuse only	45 A *	10	8
	ESV113N02TXB, ESV113N02TX~, ESV113N02TM~	M80 A	* use Fuse only	80 A *	16	6
	ESV153N02TXB, ESV153N02TX~, ESV153N02TM~	M100 A	* use Fuse only	90 A *	16	4
400V or 480V 3~(3/PE)	ESV371N04TXB ...ESV222N04TXB ESV371N04T_* ...ESV222N04T_* ESV371N04TF* ...ESV222N04TF*	M10 A	C10 A	10 A	1.5	14
	ESV302N04T_*	M16 A	C16 A	15 A	2.5	14
	ESV402N04TXB, ESV402N04T_*	M16 A	C16 A	20 A	2.5	14
	ESV552N04TXB, ESV552N04T_*	M20 A	C20 A	20 A	2.5	14
	ESV752N04TXB, ESV752N04T_~	M25 A	C25 A	25 A	4.0	10
400V or 480V 3~(3/PE)	ESV113N04TXB, ESV113N04T_~	M40 A	* use Fuse only	40 A *	4	8
	ESV153N04TXB, ESV153N04T_~	M50 A	* use Fuse only	50 A *	10	8
	ESV183N04TXB, ESV183N04T_~	M63 A	* use Fuse only	70 A *	10	6
	ESV223N04TXB, ESV223N04T_~	M80 A	* use Fuse only	80 A *	16	6
	ESV303N04TXB	M100 A	* use Fuse only	100 A *	25	4
	ESV373N04TXB	M125 A	* use Fuse only	125 A *	35	2
	ESV453N04TXB	M160 A	* use Fuse only	150 A *	35	1
600V 3~(3/PE)	ESV751N06TXB ...ESV222N06TXB ESV751N06T_* ...ESV222N06T_*	M10 A	C10 A	10 A	1.5	14
	ESV402N06TXB, ESV402N06T_*	M16 A	C16 A	12 A	1.5	14
	ESV552N06TXB, ESV552N06T_*	M16 A	C16 A	15 A	2.5	14
	ESV752N06TXB, ESV752N06T_~	M20 A	C20 A	20 A	2.5	12
	ESV113N06TXB, ESV113N06TX~, ESV113N06TM~	M32 A	C32 A	30 A	4	10
	ESV153N06TXB, ESV153N06TX~, ESV153N06TM~	M40 A	* use Fuse only	40 A *	4	8
	ESV183N06TXB, ESV183N06TX~, ESV183N06TM~	M50 A	* use Fuse only	50 A *	6	8
	ESV223N06TXB, ESV223N06TX~, ESV223N06TM~	M63 A	* use Fuse only	60 A *	10	8
	ESV303N06TXB	M80 A	* use Fuse only	70 A *	16	6
	ESV373N06TXB	M100 A	* use Fuse only	90 A *	16	4
	ESV453N06TXB	M125 A	* use Fuse only	110 A *	25	2

Notes for Fuse and Cable Table:

(1) Installations with high fault current due to large supply mains may require a type D circuit breaker.
(2) UL Class CC or T fast-acting current-limiting type fuses, 200,000 AIC, preferred. Bussman KTK-R, JJN or JJS or equivalent.
(3) Thermomagnetic type breakers preferred.

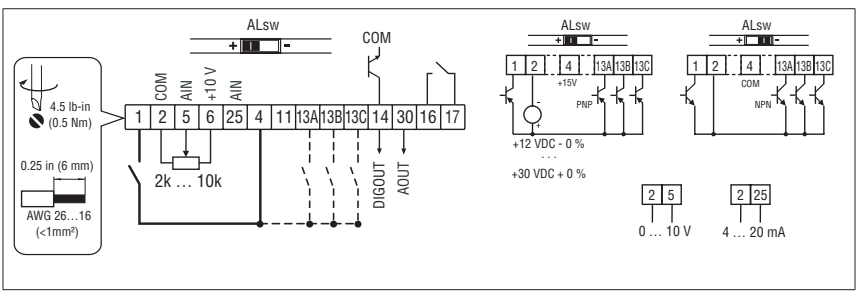
_ 11th digit of part number:	F = Integral EMC Filter
	L = Integral EMC Filter and Integrated Disconnect Switch (NEMA 4X/IP65 Models only)
	M = Integrated Disconnect Switch (NEMA 4X/IP65 Models only)
	X = No EMC Filter/ No Disconnect Switch
* = Last digit of part number:	C = N4X Indoor only (convection cooled)
	E = N4X Indoor/Outdoor (convection cooled)
~ = Last digit of part number:	D = N4X Indoor only (fan cooled)
	F = N4X Indoor/Outdoor (fan cooled)

Observe the following when using Ground Fault Circuit Interrupters (GFCIs):

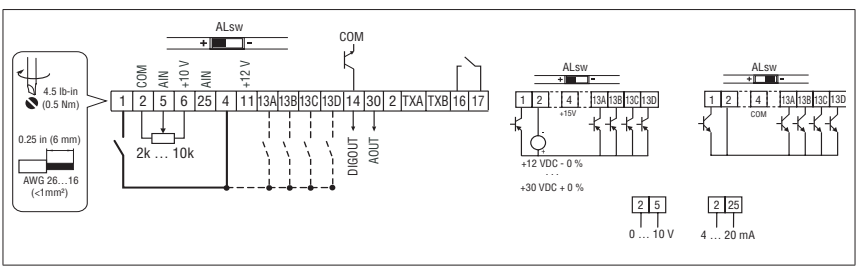
- Installation of GFCI only between supplying mains and controller.
- The GFCI can be activated by:
  - capacitive leakage currents between the cable screens during operation (especially with long, screened motor cables)
  - connecting several controllers to the mains at the same time
  - RFI filters

3.2.3 Control Terminals

Control Terminal Strip for 0.33 - 10 HP (0.25 - 7.5 kW):



Control Terminal Strip for 15HP (11 kW) and Greater Drives:



NOTE
Control and communications terminals provide basic insulation when the drive is connected to a power system rated up to 300V between phase to ground (PE) and the applied voltage on terminals 16 and 17 is less than 250 VAC between phase to phase and ground (PE).

Control Terminal Strip Descriptions

Terminal	Description	Important
1	Digital Input: Start/Stop	input resistance = 4.3kΩ
2	Analog Common	
5	Analog Input: 0...10 VDC	input resistance: >50 kΩ
6	Internal DC supply for speed pot	+10 VDC, max. 10 mA
25	Analog Input: 4...20 mA	input resistance: 250Ω
4	Digital Reference/Common	+15 VDC / 0 VDC, depending on assertion level
11	Internal DC supply for external devices	+12 VDC, max. 50 mA
13A	Digital Input: Configurable with P121	input resistance = 4.3kΩ
13B	Digital Input: Configurable with P122	
13C	Digital Input: Configurable with P123	
13D*	Digital Input: Configurable with P124	
14	Digital Output: Configurable with P142, P144	DC 24 V / 50 mA; NPN
30	Analog Output: Configurable with P150…P155	0…10 VDC, max. 20 mA
2*	Analog Common	
TXA*	RS485 TxA	
TXB*	RS485 TxB	
16	Relay output: Configurable with P140, P144	AC 250 V / 3 A DC 24 V / 2 A … 240 V / 0.22 A, non-inductive
17		

***** = Terminal is part of the terminal strip for the 15HP (11kW) and higher models only.

Assertion level of digital inputs

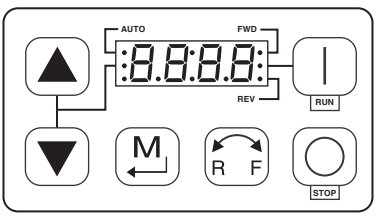
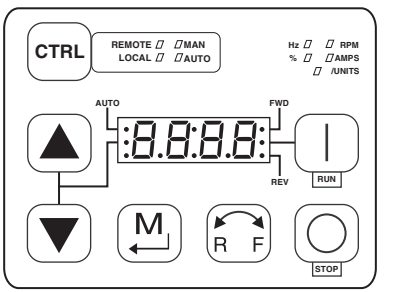
The digital inputs can be configured for active-high or active-low by setting the Assertion Level Switch (ALsw) and P120. If wiring to the drive inputs with dry contacts or with PNP solid state switches, set the switch and P120 to “High” (+). If using NPN devices for inputs, set both to “Low” (-). Active-high (+) is the default setting.

HIGH = +12 … +30 V
LOW = 0 … +3 V

NOTE
An **F_AL** fault will occur if the Assertion Level switch (ALsw) position does not match the parameter P120 setting and P100 or any of the digital inputs (P121...P124) is set to a value other than 0.

4 Commissioning

4.1 Local Keypad & Display

SMV Models: 0.33-10HP (0.25-7.5kW)	SMV Models: 15HP (11kW) and greater
	
4-Character Display	4-Character plus CTRL Display

Display	START BUTTON
RUN	In Local Mode (P100 = 0, 4, 6), this button will start the drive.
	STOP BUTTON
STOP	Stops the drive, regardless of which mode the drive is in. ⚠ **WARNING!** When JOG is active, the STOP button will not stop the drive!
	ROTATION
R F	In Local Mode (P100 = 0, 4, 6), this selects the motor rotation direction: - The LED for the present rotation direction (FWD or REV) will be on - Press R/F; the LED for the opposite rotation direction will blink - Press M within 4 seconds to confirm the change - The blinking direction LED will turn on, and the other LED will turn off When rotation direction is changed while the drive is running, the commanded direction LED will blink until the drive is controlling the motor in the selected direction. Rotation is set in P112. When P112 = 0, rotation is forward only. When P112 = 1 rotation is forward and reverse.
	MODE
M	Used to enter/exit the Parameter Menu when programming the drive and to enter a changed parameter value.
	UP AND DOWN BUTTONS
▲ ▼	Used for programming and can also be used as a reference for speed, PID setpoint, or torque setpoint. When the ▲ and ▼ buttons are the active reference, the middle LED on the left side of the display will be on.

Display	INDICATING LEDs (on 4-character display)
	FWD LED: Indicate the present rotation direction is forward. Refer to ROTATION description above.
	REV LED: Indicate the present rotation direction is reverse. Refer to ROTATION description above.
	AUTO LED: Indicates that the drive has been put into Auto mode from one of the TB13 inputs (P121…P124 set to 1…7). Indicates that PID mode is active (if PID mode is enabled). Indicates that sequencer mode is active (if sequencer mode is enabled).
	RUN LED: Indicates that the drive is running.
	▲ ▼ LED: Indicates that the ▲ ▼ are the active reference.
	NOTE If the keypad is selected as the auto reference (P121…P124 is 6) and the corresponding TB-13 input is closed, the AUTO LED and ▲ ▼ LEDs will both be on.
	FUNCTIONS THAT FOLLOW ARE APPLICABLE TO SMV DRIVES 15HP (11kW) AND HIGHER
CTRL	**CTRL** The CTRL pushbutton selects the start and speed reference control sources for the drive. Press [M] mode button to accept the new control mode selection.

CTRL LEDs		START CONTROL	REFERENCE CONTROL
REMOTE ☐ ■ MAN LOCAL ■ ☐ AUTO	[LOCAL] [MAN]	Keypad	P101 Settings
REMOTE ☐ ☐ MAN LOCAL ■ ■ AUTO	[LOCAL] [AUTO]	Keypad	Terminal 13x Settings
REMOTE ■ ■ MAN LOCAL ☐ ☐ AUTO	[REMOTE] [MAN]	Terminal Strip	P101 Settings
REMOTE ■ ☐ MAN LOCAL ☐ ■ AUTO	[REMOTE] [AUTO]	Terminal Strip	Terminal 13x Settings

If P100 = 6 the CTRL button is used to toggle start control between the terminal strip [REMOTE] and the keypad [LOCAL]	- REM/LOC LED indicating the present start control source is ON - Press [CTRL]; the LED for other start control source will blink - Press [M] within 4 sec to confirm the change - Blinking LED will turn ON (the other LED will turn OFF)
If P113 = 1 the CTRL button is used to toggle reference control between the TB-13x setup [AUTO] and P101 [MANUAL]	- AUT/MAN LED indicating present reference control is ON - Press [CTRL]; the other reference control will blink - Press [M] within 4 sec to confirm change - Blinking LED will turn ON (the other LED will turn OFF)
If P100 = 6 and P113 = 1, it is possible to change the start and reference control sources at the same time	

Display	START CONTROL	
	The REMOTE/LOCAL LEDs indicate the current start control source. If the start control source is a remote keypad or the network, then both LEDs will be OFF.	
	REFERENCE CONTROL	
	The AUTO/MANUAL LEDs indicate the current reference control source.	
	IF P113 = 0 or 2, the AUTO/MANUAL LEDs will match the AUTO LED on the 4-character display. IF P113 = 0 and no AUTO reference has been setup on the terminal strip, the MANUAL LED will turn ON and the AUTO LED will turn OFF.	
	IF P113 = 1, the AUTO/MANUAL LEDS show the commanded reference control source as selected by the [CTRL] button. If the [CTRL] button is used to set the reference control source to AUTO but no AUTO reference has been setup on the terminal strip, reference control will follow P101 but the AUTO LED will remain ON.	
	UNITS LEDs	
	HZ: current display value is in Hz	In Speed mode, if P178 = 0 then HZ LED will be ON. If P178 > 0, the Units LEDs follow the setting of P177 when the drive is in run (non-programming) mode. In Torque mode, the HZ LED will be ON when the drive is in run (non-programming) mode. In Pid mode, the Units LEDs follow the setting of P203 when the drive is in run (non-programming) mode. If P179 > 0, the Units LEDs will show the unit of the diagnostic parameter that is being displayed.
	%: current display value is in %	
	RPM: current display value is in RPM	
	AMPS: current display value is in Amps	
	/UNITS current display value is a per unit (i.e./sec, /min, /hr, etc.)	

4.2 Drive Display and Modes of Operation

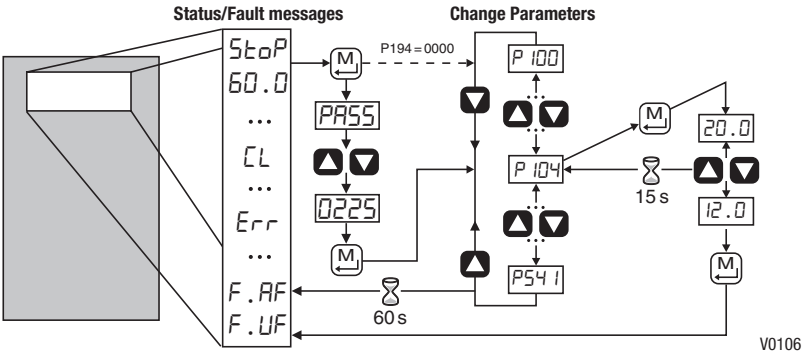
Speed Mode Display
In the standard mode of operation, the drive frequency output is set directly by the selected reference (keypad, analog reference, etc.). In this mode, the drive display will show the drive's output frequency.

PID Mode Display
When the PID mode is enabled and active, the normal run display shows the actual PID setpoint. When PID mode is not active, the display returns to showing the drive's output frequency.

Torque Mode Display
When the drive is operating in Vector Torque mode, the normal run display shows the drive's output frequency.

Alternate (Run-Screen) Display
When P179 (Run Screen Display) is set to a value other than 0, one of the diagnostic parameters (P501…P599) is displayed. Example: if P179 is set to 1, then diagnostic parameter P501 (Software version) is displayed. If P179 =2, then P502 (Drive ID) is displayed.

4.3 Parameter Setting



4.4 Electronic Programming Module (EPM)

The EPM contains the drives operational memory. Parameter settings are stored in the EPM and setting changes are made to the "User settings" in the EPM.

An optional EPM Programmer (model EEPM1RA) is available that allows:

- An EPM to be copied directly to another EPM.
- An EPM to be copied to the memory of the EPM Programmer.
- Stored files can be modified in the EPM Programmer.
- Stored files can be copied to another EPM.

EPM Module in SMV Drive

As the EPM Programmer is battery operated, parameter settings can be copied to an EPM and inserted into a drive without power being applied to the drive. This means that the drive will be fully operational with the new settings on the next application of power.

Additionally, when the drives parameter settings are burned into an EPM with the EPM Programmer, the settings are saved in two distinct locations; the "User settings" and the "OEM default settings". While the User settings can be modified in the drive, the OEM settings cannot. Thus, the drive can be reset not only to the "factory" drive default settings (shown in this manual), but can be set to the Original Machine settings as programmed by the OEM.

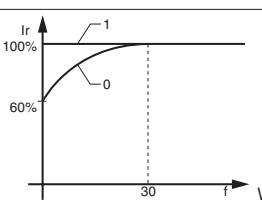
The user area contents of the EPM are what are copied into the OEM space by the EPM programmer. When parameter modifications are made to the drive and then a copy made via the EPM Programmer, these are the settings that will be available by the OEM selections from P199. The EPM Programmer is the only way to load the OEM area of the EPM.

While the EPM can be removed for copying or to use in another drive, it must be installed for the drive to operate (a missing EPM will trigger an **F_FI** fault)

4.5 Parameter Menu

4.5.1 Basic Setup Parameters

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P100	Start Control Source	0	0 Local Keypad	Use RUN button on front of drive to start
			1 Terminal Strip	Use start/stop circuit wired into the terminal strip. Refer to section 3.2.3
			2 Remote Keypad Only	Use RUN button on optional Remote Keypad to start
			3 Network Only	• Start command must come from network (Modbus, CANopen, etc) • SMV models <15HP (11kW) require optional communication module (refer to the network module documentation). • Must also set one of the TB-13 inputs to 9 (Network Enable); see P121...P124
			4 Terminal Strip or Local Keypad	Allows start control to be switched between terminal strip and local keypad using one of the TB-13 inputs. See note below.
			5 Terminal Strip or Remote Keypad	Allows start control to be switched between terminal strip and optional remote keypad using one of the TB-13 inputs. See Note below
			6 CTRL button select	Allows start control to be switched between terminal strip and local keypad using the CTRL button. **NOTE:** P100 Selection 6 is applicable to SMV 15HP (11kW) and higher models only.
		⚠	**WARNING!** P100 = 0 disables TB-1 as a STOP input! STOP circuitry may be disabled if parameters are reset back to defaults (see P199)	
		ℹ	**NOTE** • P100 = 4, 5: To switch between control sources, one of the TB-13 inputs (P121...P124) must be set to 08 (Control Select); TB-13x OPEN (or not configured): Terminal strip control TB-13x CLOSED: Local (P100 = 4) or Remote (P100 = 5) keypad • P100 = 0, 1, 4, 6: Network can take control if P121...P124 = 9 and the corresponding TB-13x input is CLOSED. • The STOP button on the front of the drive is always active except in JOG mode. • TB-1 is an active STOP input if P100 is set to a value other than 0. • An F_AL fault will occur if the Assertion Level switch (ALsw) position does not match the P120 setting and P100 is set to a value other than 0.	
P101	Standard Reference Source	0	0 Keypad (Local or Remote)	Selects the default speed or torque reference when no Auto Reference is selected using the TB-13 inputs.
			1 0-10 VDC	
			2 4-20 mA	
			3 Preset #1 (P131)	
			4 Preset #2 (P132)	
			5 Preset #3 (P133)	
			6 Network	
			7 Preset Sequence Segment #1 (P710)	Selections 7, 8 & 9 are not valid for PID setpoint or torque reference.
			8 Preset Sequence Segment #2 (P715)	
			9 Preset Sequence Segment #3 (P720)	

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P 102	Minimum Frequency	0.0	0.0	{Hz}	P103	• P102, P103 are active for all speed references • When using an analog speed reference, also see P160, P161
P 103	Maximum Frequency	60.0	7.5	{Hz}	500	
			NOTE • P103 cannot be set below Minimum Frequency (P102) • To set P103 above 120 Hz: - Scroll up to 120 Hz; display shows H iFr (flashing). - Release ▽ button and wait one second. - Press ▽ button again to continue increasing P103.			
	WARNING! Consult motor/machine manufacturer before operating above rated frequency. Overspeeding the motor/machine may cause damage to equipment and injury to personnel!					
P 104	Acceleration Time 1	20.0	0.0	{s}	3600	• P104 = time of frequency change from 0 Hz to P167 (base frequency) • P105 = time of frequency change from P167 to 0 Hz • For S-ramp accel/decel, adjust P106
P 105	Deceleration Time 1	20.0	0.0	{s}	3600	
	EXAMPLE: IF P103 = 120 Hz, P104 = 20.0 s and P167 (base frequency) = 60 Hz; then the rate of frequency change from 0 Hz to 120 Hz = 40.0 s					
P 106	S-Ramp Integration Time	0.0	0.0	{s}	50.0	• P106 = 0.0: Linear accel/decel ramp • P106 > 0.0: Adjusts S-ramp curve for smoother ramp
P 107 (1)	Line Voltage Selection	1*	0 Low (120, 200, 400, 480VAC) 1 High (120, 240, 480, 600VAC)			* The default setting is 1 for all drives except when using "Reset to 50Hz default settings" (Parameter P199, selection 4) with 480V models. In this case, the default setting is 0.
P 108	Motor Overload	100	30	{%}	100	P108 = motor current rating x 100 SMV output rating Example: if motor = 3amps and SMV = 4amps, then P108 = 75%
			NOTE Do not set above rated motor current as listed on the motor dataplate. The motor thermal overload function of the SMV is UL approved as a motor protection device. Cycling power after an overload fault could result in significantly reducing the motor life.			
P 109	Motor Overload Type	0	0 Speed Compensation 1 No Speed Compensation Example: Motor is cooled by forced ventilation as apposed to shaft mounted, self cooling fans.			

(1) Any changes to this parameter will not take effect until the drive is stopped.

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P110	Start Method	0	0 Normal	
			1 Start on Power-up	Drive will automatically start when power is applied.
			2 Start with DC Brake	When start command is applied, drive will apply DC braking according to P174, P175 prior to starting the motor
			3 Auto Restart	Drive will automatically restart after faults, or when power is applied.
			4 Auto Restart with DC Brake	Combines settings 2 and 3
			5 Flying Start/Restart - Type 1	• Drive will automatically restart after faults, or when power is applied. • After 3 failed attempts, drive will Auto Restart with DC brake. • P110 = 5, 7: Performs speed search, starting at Max Frequency (P103) • P110 = 6, 8: Performs speed search, starting at the last output frequency prior to faulting or power loss • If P111 = 0, a flying START is performed when a start command is applied. • P110 = 7,8: Utilizes P280/281 to set Max Current Level and Decel Time for restart
			6 Flying Start/Restart - Type 1	
			7 Flying Start /Restart - Type 2 for 2-pole motors requiring a flying restart	
			8 Flying Start/Restart - Type 2 for 2-pole motors requiring a flying restart	
			NOTE • P110 = 0, 2: Start command must be applied at least 2 seconds after power-up; F_UF fault will occur if start command is applied too soon. • P110 = 1, 3…6: For automatic start/restart, the start source must be the terminal strip and the start command must be present. • P110 = 2, 4…6: If P175=999.9, dc braking will be applied for 15s. • P110 = 3…6: Drive will attempt 5 restarts; if all restart attempts fail, drive displays LC (fault lockout) and requires manual reset. • P110 = 5, 6: If drive cannot catch the spinning motor, drive will trip into F_rF fault. • P110 = 5, 6: If drive trips into F_OF fault, try P110 = 7 or 8.	
	WARNING! Automatic starting/restarting may cause damage to equipment and/or injury to personnel! Automatic starting/restarting should only be used on equipment that is inaccessible to personnel.			
P111	Stop Method	0	0 Coast	Drive's output will shut off immediately upon a stop command, allowing the motor to coast to a stop
			1 Coast with DC Brake	The drive's output will shut off and then the DC Brake will activate (refer to P174, P175)
			2 Ramp	The drive will ramp the motor to a stop according to P105 or P126.
			3 Ramp with DC Brake	The drive will ramp the motor to 0 Hz and then the DC Brake will activate (refer to P174, P175)
P112	Rotation	0	0 Forward Only	If PID mode is enabled, reverse direction is disabled (except for Jog).
			1 Forward and Reverse	

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P113	Auto/Manual Control	0	0 Terminal Strip Control	The reference is dictated by the settings and state of the TB-13x terminals. If no AUTO reference has been setup on the terminal strip then reference control is dictated by P101.
			1 Auto/Manual (CTRL button select)	Allows the reference to be switched between auto and manual using the CTRL pushbutton on the drive keypad. If the CTRL pushbutton has selected AUTO reference but no AUTO reference has been setup on the terminal strip, then reference control is dictated by P101.
			2 Manual Control Only	Reference is dictated by P101 regardless of any AUTO source that may be selected by the TB-13x terminals.
			**NOTE** P113 is applicable to SMV 15HP (11kW) and higher models only.	
P115	MOP Speed Initialization at Power-Up	0	0 Set to last MOP speed at power up	Output frequency at power-up = last MOP speed
			1 Set to 0.0Hz at power up	Output frequency at power-up = 0Hz
			2 Set to Preset #3 (P133) at power up	Output frequency at power-up = P133

4.5.2 I/O Setup Parameters

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P 120	Assertion Level	2	1 Low 2 High	P120 and the Assertion Level switch must both match the desired assertion level unless P100, P121…P124 are all set to 0. Otherwise an F.AL fault will occur.
P 121	TB-13A Digital Input	0	0 None	Disables input
			1 AUTO Reference: 0-10 VDC	For frequency mode, see P160...P161, For PID mode, see P204…P205, For vector torque mode, see P330
			2 AUTO Reference: 4-20 mA	
P 122	TB-13B Digital Input (Priority > TB13A) Same as TB13A except: 3 = Preset #2 23 = Seq Seg, #2		3 AUTO Reference: Preset #1 * 13D: 3 = Reserved	For frequency mode see P131...P137, For PID mode, see P231…P233, For torque mode see, P331…P333
			4 AUTO Reference: MOP Up	• Normally open: Close input to increase or decrease speed, PID or torque setpoint. • MOP Up is not active while in STOP
P 123	TB-13C Digital Input (Priority > TB13B, A) Same as TB13A except: 3 = Preset #3 23 = Seq Seg, #4		5 AUTO Reference: MOP Down	
			6 AUTO Reference: Keypad	
			7 AUTO Reference: Network	
			8 Control Select	Use when P100 = 4, 5 to switch between terminal strip control and local or remote keypad control.
P 124	TB-13D* Digital Input (Priority > TB13C, B, A) Same as TB13A except: 3 = Preset #4 23 = Seq Seg, #8		9 Network Enable	Required to start the drive through the network.
			10 Reverse Rotation	Open = Forward Closed = Reverse
			11 Start Forward	Refer to Note for typical circuit
			12 Start Reverse	
			13 Run Forward	Refer to Note for typical circuit
			14 Run Reverse	
	NOTE: P124 is applicable to SMV 15HP (11kW) and higher models only		15 Jog Forward	Jog Forward speed = P134
			16 Jog Reverse	Jog Reverse speed = P135 ⚠ Active even if P112 = 0
			17 Accel/Decel #2	Refer to P125, P126
			18 DC Brake	Refer to P174; close input to override P175
			19 Auxiliary Ramp to Stop	Normally closed: Opening input will ramp drive to STOP according to P127, even if P111 is set to Coast (0 or 1).
			20 Clear Fault	Close to reset fault
			21 External Fault F_EF	Normally closed circuit; open to trip
			22 Inverse External Fault F_EF	Normally open circuit; close to trip
			23 AUTO Ref: Sequence Segment #1	Works in Speed Mode only
			24 Start Sequence	
			25 Step Sequence	Transition from non-asserted to asserted state
			26 Suspend Sequence	

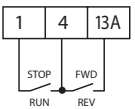
⚠ **WARNING**
Jog overrides all STOP commands! To stop the drive while in Jog mode, the Jog input must be deactivated or a fault condition induced.

⚠ **WARNING**
If the input defined to “Start Sequence” is opened during a sequence, the drive will exit sequencer mode and will run at the specified standard or alternate speed source (dependent on drive configuration).

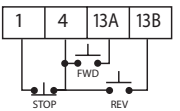
Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			

NOTE
- When input is activated, settings 1...7 override P101
- When TB-13A...TB-13D are configured for Auto References other than MOP, TB-13D overrides TB-13C, TB-13C overrides TB-13B and TB-13B overrides TB-13A. Any other Auto Reference will have priority over MOP.
- Settings 10...14 are only valid in Terminal Strip mode (P100 = 1, 4, 5, 6)
- If Start/Run/Jog Forward and Start/Run/Jog Reverse are both activated, drive will STOP
- If Jog input is activated while drive is running, the drive will enter Jog mode; when Jog input is deactivated, drive will STOP
- An **F_AL** fault will occur if the Assertion Level switch (ALsw) position does not match the P120 setting and any of the digital inputs (P121...P124) are set to a value other than 0.
- An **F_IL** fault will occur under the following conditions:
  - TB-13A...TB-13D settings are duplicated (each setting, except 0, 3 and 23, can only be used once)
  - One input is set to "MOP Up" and another is not set to "MOP Down", or vice-versa.
  - One input is set to 10 and another input is set to 11…14.
  - One input is set to 11 or 12 and another input is set for 13 or 14.
- Typical control circuits are shown below:
  - If any input is set to 10, 12 or 14, P112 must be set to 1 for Reverse action to function.

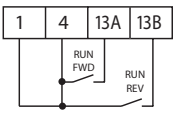
Run / Stop with Direction
P121 = 10



Start Forward / Start Reverse
P121 = 11, P122 = 12



Run Forward / Run Reverse
P121 = 13, P122 = 14



P125	Acceleration Time 2	20.0	0.0	{s}	3600	• Selected using TB-13A...TB-13D (P121... P124 = 17) • For S-ramp accel/decel, adjust P106
P126	Deceleration Time 2	20.0	0.0	{s}	3600	
P127	Deceleration Time for Auxiliary Ramp to Stop	20.0	0.0	{s}	3600	• Selected using TB-13A...TB-13D (P121... P124 = 19). • For S-ramp accel/decel, adjust P106 • Once executed, this ramp time has priority over P105 and P126.
P129	Automatic Accel/ Decel rate switch threshold	0.0	0.0	{Hz}	1000	If Actual Frequency < P129 Use Accel/decel time #2 (P125/P126) If Actual Frequency > P129 Use Accel/decel time #1 (P104/P105)
P131	Preset Speed #1	0.0	0.0	{Hz}	500	
P132	Preset Speed #2	0.0	0.0	{Hz}	500	
P133	Preset Speed #3	0.0	0.0	{Hz}	500	
P134	Preset Speed #4	0.0	0.0	{Hz}	500	
P135	Preset Speed #5	0.0	0.0	{Hz}	500	
P136	Preset Speed #6	0.0	0.0	{Hz}	500	
P137	Preset Speed #7	0.0	0.0	{Hz}	500	
P138	Preset Speed #8	0.0	0.0	{Hz}	500	

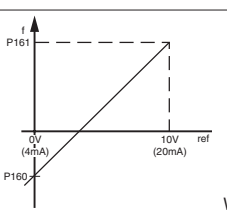
PRESET SPEED	13A	13B	13C	13D
1	X	--	--	--
2	--	X	--	--
3	--	--	X	--
4	X	X	--	--
4 (alternate)	--	--	--	X
5	X	--	X	--
6	--	X	X	--
7	X	X	X	--
8 (alternate)	--	X	--	X
8 (alternate	--	--	X	X

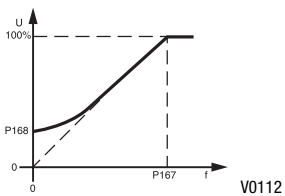
- Speed setting is used by P158
- 13D available on 15HP (11kW) & higher drives.

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P 140	Relay Output TB-16, 17	0	0 None	Disables the output
			1 Run	Energizes when the drive is running
			2 Reverse	Energizes when reverse rotation is active
			3 Fault	De-energizes when the drive trips, or power is removed
			4 Inverse Fault	Energizes when the drive trips
			5 Fault Lockout	P110 = 3...6: De-energizes if all restart attempts fail
			6 At Speed	Energizes when output frequency = commanded frequency
			7 Above Preset Speed #6	Energizes when output frequency > P136
			8 Current Limit	Energizes when motor current = P171
			9 Follower Loss (4-20 mA)	Energizes when 4-20 mA signal is < P164
			10 Loss of Load	Energizes when motor load drops below P145; Refer to P146 also
			11 Local Keypad Control Active	Energizes when the selected source is active for start control
			12 Terminal Strip Control Active	
			13 Remote Keypad Control Active	
			14 Network Control Active	
			15 Standard Reference Active	Energizes when P101 reference is active
			16 Auto Reference Active	Energizes when Auto Reference is activated using TB-13 input; refer to P121...P124
			17 Sleep Mode Active	Refer to P240...P242
			18 PID Feedback < Min. Alarm	Energizes when PID feedback signal < P214
			19 Inverse PID Feedback < Min. Alarm	De-energizes when PID feedback signal < P214
			20 PID Feedback > Max Alarm	Energizes when PID feedback signal > P215
			21 Inverse PID Feedback > Max Alarm	De-energizes when PID feedback signal > P215
			22 PID Feedback within Min/Max Alarm range	Energizes when PID feedback signal is within the Min/Max Alarm range; refer to P214, P215
			23 PID Feedback outside Min/Max Alarm range	Energizes when PID feedback signal is outside the Min/Max Alarm range; refer to P214, P215
			24 Reserved	
			25 Network Controlled	SMV models < 15HP (11kW) require an optional communication module (refer to the network module documentation).
			26 Loss of 0-10V Input	Energizes when 0-10V signal is < P158
			27 Sequencer Controlled	State set in individual sequencer segments
			28 Sequencer Active	
			29 Sequencer Suspended	
			30 Sequence Done	End Sequence
			31 Output Frequency = 0.0Hz	Output inactive
P 142	TB-14 Output	0	0...23 (same as P140)	
			24 Dynamic Braking	For use with Dynamic Braking option
			25...31 (same as P140)	

<table>
<tr><th colspan="2">Code</th><th colspan="2">Possible Settings</th><th rowspan="2">IMPORTANT</th></tr>
<tr><th>No.</th><th>Name</th><th>Default</th><th>Selection</th></tr>
<tr><td>P144</td><td>Digital Output Inversion</td><td></td><td><table><tr><th>P144</th><th>Invert P142</th><th>Invert P140</th></tr><tr><td>0</td><td>NO</td><td>NO</td></tr><tr><td>1</td><td>NO</td><td>YES</td></tr><tr><td>2</td><td>YES</td><td>NO</td></tr><tr><td>3</td><td>YES</td><td>YES</td></tr></table></td><td>Used to invert the selections for P140 (Relay Output) and P142 (TB-14 Output).
EXAMPLE: When P140 = 6 (AT SPEED), the relay is energized when output frequency = commanded frequency. IF P144=1 or 3, then P140 is inverted (INVERSE AT SPEED) and the relay is energized when the output frequency does not equal the command frequency.</td></tr>
<tr><td></td><td></td><td></td><td>NOTE
Inverting P140 or P142 when the parameter is set to NONE (0) will result in the output being energized continuously.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>NOTE
For SMVector drives rated at 0.33 to 10 HP (0.25 to 7.5 kW), P144 is only available with software versions 3.0 and higher (refer to P501).</td><td></td></tr>
<tr><td>P145</td><td>Loss of Load Threshold</td><td>0</td><td>0 {%} 200</td><td rowspan="2">P140, P142 = 10: Output will energize if motor load falls below the P145 value longer than the P146 time</td></tr>
<tr><td>P146</td><td>Loss of Load Delay</td><td>0.0</td><td>0.0 {s} 240.0</td></tr>
<tr><td>P149</td><td>Analog Output Offset</td><td>0.0</td><td>0 {%} 100</td><td>Scaled value. Example: P149 = 10%, Scaled variable = freq, P150 = 1, P152 = 60Hz; then TB30 = 0VDC below 6Hz</td></tr>
<tr><td rowspan="11">P150</td><td rowspan="11">TB-30 Output</td><td rowspan="11">0</td><td>0 None</td><td rowspan="10">2-10 VDC signal can be converted to 4-20 mA with a total circuit impedance of 500 Ω</td></tr>
<tr><td>1 0-10 VDC Output Frequency</td></tr>
<tr><td>2 2-10 VDC Output Frequency</td></tr>
<tr><td>3 0-10 VDC Load</td></tr>
<tr><td>4 2-10 VDC Load</td></tr>
<tr><td>5 0-10 VDC Torque</td></tr>
<tr><td>6 2-10 VDC Torque</td></tr>
<tr><td>7 0-10 VDC Power (kW)</td></tr>
<tr><td>8 2-10 VDC Power (kW)</td></tr>
<tr><td>9 Network Controlled</td><td>SMV models < 15HP (11kW) require an optional communication module (refer to the network module documentation).</td></tr>
<tr><td>10 Sequencer Controlled</td><td>Value set in individual sequencer segments</td></tr>
<tr><td>P151</td><td>Add Analog Input to TB-30 Output</td><td>0</td><td><table><tr><th>P151</th><th>Add TB-25 (4-20mA)</th><th>Add TB-5 (0-10VDC)</th></tr><tr><td>0</td><td>NO</td><td>NO</td></tr><tr><td>1</td><td>NO</td><td>YES</td></tr><tr><td>2</td><td>YES</td><td>NO</td></tr><tr><td>3</td><td>YES</td><td>YES</td></tr></table></td><td>This parameter adds the analog input signal(s) to the TB-30 Output signal. EXAMPLE: If a drive is running at 60Hz with P150 set to 1 (0-10VDC Freq) and P152 set to 240.0Hz, the output at TB-30 would be 2.5VDC. If there is a 2.0VDC signal going into TB-5 and P151 is set to 1 (ADD TB-5), the output at TB-30 would become 4.5VDC.</td></tr>
<tr><td>P152</td><td>TB-30 Scaling: Frequency</td><td>60.0</td><td>3.0 {Hz} 2000</td><td>If P150 = 1 or 2, sets the frequency at which output equals 10 VDC</td></tr>
<tr><td>P153</td><td>TB-30 Scaling: Load</td><td>200</td><td>10 {%} 500</td><td>If P150 = 3 or 4, sets the Load (as a percent of drive current rating) at which output equals 10 VDC.</td></tr>
<tr><td>P154</td><td>TB-30 Scaling: Torque</td><td>100</td><td>10 {%} 1000</td><td>If P150 = 5 or 6, sets the Torque (as a percent of motor rated torque) at which output equals 10 VDC</td></tr>
<tr><td>P155</td><td>TB-30 Scaling: Power (kW)</td><td>1.0</td><td>0.1 {kW} 200.0</td><td>If P150 = 7 or 8, sets the power at which output equals 10 VDC</td></tr>
</table>

4.5.3 Advanced Setup Parameters

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P 156	Analog Inputs Configuration	0	0 TB5: (0-10 VDC); TB25: (4-20mA) 1 TB5: (0 - 5 VDC); TB25: (4-20mA) 2 TB5: (2 - 10 VDC); TB25: (4-20mA) 4 TB5: (0-10 VDC); TB25: (0-20mA) 5 TB5: (0 - 5 VDC); TB25: (0-20mA) 6 TB5: (2 - 10 VDC); TB25: (0-20mA)			
P 157	TB5 (0-10V) Analog Input Monitoring Action	0	0 No Action 1 If TB5 < P158 - Trip Fault F_FAU 2 If TB5 < P158 - Run Preset #8 3 If TB5 < P158 - Run Preset Seg. #16 4 If TB5 > P158 - Trip Fault F_FAU 5 If TB5 > P158 - Run Preset #8 6 If TB5 > P158 - Run Preset Seg. #16			Selects the reaction to a loss of the 0-10V signal at TB5 500ms is the minimum time above/below Monitoring Level (P158) before triggering the drive to trip or run at a preset speed. For P157 = 3 or 6, the accel/decel time is set in P786. **NOTE:** P157 has priority over P163 and TB-13 presets/auto references (P121-P124)
P 158	TB5 (0-10V) Analog Input Monitoring Level (ML)	0.0	-10.0	{VDC}	10.0	Negative input voltage is not currently supported.
P 159	0-10V Analog Input Deadband	0.0	0	{VDC}	10.0	Not active if [-10 to +10 VDC] option is selected.
P 160	Speed at Minimum Signal	0.0	-999.0	{Hz}	1000	 V0111
P 161	Speed at Maximum Signal	60.0	-999.0	{Hz}	1000	
			NOTE • P160 sets the output frequency at 0% analog input • P161 sets the output frequency at 100% analog input • P160 or P161 < 0.0 Hz: For scaling purposes only; does not indicate opposite direction! • P160 > P161: Drive will react inversely to analog input signal			
P 162	Analog Input Filter	0.01	0.00	{s}	10.00	• Adjusts the filter on the analog inputs (TB-5 and TB-25) to reduce the effect of signal noise • The P162 delay time will affect the response time of diagnostic parameters (P520-P523).
P 163	TB-25 (4-20mA) Analog Input Monitoring Action	0	0 No Action 1 If TB25 < P164 - Trip Fault F_FaL 2 If TB25 < P164 - Run Preset #7 3 If TB25 < P164 - Run Preset Seg. #15 4 If TB25 ≥ P164 - Trip Fault F_FaL 5 If TB25 ≥ P164 - Run Preset #7 6 If TB25 ≥ P164 - Run Preset Seg. #15			• Selects the reaction to a loss of the 4-20 mA signal at TB-25. • Signal is considered lost if it falls below the value set in P164 • Digital outputs can also indicate a loss of 4-20 mA signal; see P140, P142 • For P163 = 3 or 6, the accel/decel time is set in P781. **NOTE:** P163 has priority over TB-13 presets/auto references (P121-P124)

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P164	TB-25 (4-20mA) Analog Input Monitoring Level	2.0	0.0	{mA}	20.0	
P165	Base Voltage		15	{V}	1000	Valid for V/Hz mode only. Set voltage for bus compensation in V/Hz mode
P166	Carrier Frequency	See Notes	0 4 kHz 1 6 kHz 2 8 kHz 3 10 kHz			• As carrier frequency is increased, motor noise is decreased • Observe derating in section 2.3 • Automatic shift to 4 kHz at 120% load • NEMA 4X (IP65) Models: Default = 0 (4kHz) • NEMA 1 (IP31) Models: Default = 1 (6kHz)
P167(1)	Base Frequency	60.0	10.0	{Hz}	1500	
P168	Fixed Boost		0.0	{%}	40.0	
			NOTE • P167 = rated motor frequency for standard applications • P165, P168 = default setting depends on drive rating			
P169	Accel Boost	0.0	0.0	{%}	20.0	Accel Boost is only active during acceleration
P170	Slip Compensation	0.0	0.0	{%}	40.0	Increase P170 until the motor speed no longer changes between no load and full load conditions.
P171(1)	Current Limit	Max I	30	{%}	Max I	• When the limit is reached, the drive displays CL (Current Limit), and either the acceleration time increases or the output frequency decreases. • Digital outputs can also indicate when the limit is reached; see P140, P142. • Refer to section 2.3 for the maximum output current Max I (%)
P172	Current Limit Reduction	0	0 Current Limit Reduction Active - Normal response 1 Current Limit Reduction Active - Fast response 2 Current Limit Reduction Disabled - Normal response 3 Current Limit Reduction Disabled - Fast response			In field weakening, the Current Limit is inversely proportional to the speed.
P173	Decel Override Time	2.0	0.0	{s}	60.0	Maximum time before drive trips into HF fault.
P174	DC Brake Voltage	0.0	0.0	{%}	50.0	Setting is a percent of the nominal DC bus voltage.

(1) Any changes to this parameter will not take effect until the drive is stopped.

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P175	DC Brake Time	0.0	0.0	{s}	999.9	
			NOTE: CONFIRM MOTOR SUITABILITY FOR USE WITH DC BRAKING DC Brake voltage (P174) is applied for the time specified by P175 with the following exceptions: • If P111=1, 3 and P175=999.9 the brake voltage will be applied continuously until a run or fault condition occurs. • If P110=2, 4…6 and P175=999.9, brake voltage will be applied for 15s • If P121…P124=18 and the corresponding TB-13 input is CLOSED, brake voltage will be applied until the TB-13 input is OPENED or a fault condition occurs.			
P176	Keypad Setpoint Single Press Increment	0.1	0.1		100.0	Used for run screen setpoint editing only. If P176 >0.1 then scrolling of keypad setpoint is enabled.
P177 (2)	Speed Units	0	0 Hz 1 RPM 2 % 3 /UNITS 4 NONE			Select the UNITS LED that will be illuminated when the drive is running in speed control mode. For this parameter to be used, P178 must be set to a value other than 0. IF P178 is set to 0, the Hz LED will be illuminated regardless of the value set in P177.
P178	Display Frequency Multiplier	0.00	0.00		650.00	• Allows frequency display to be scaled • P178 = 0.00: Scaling disabled • P178 > 0.00: Display = Actual Frequency X P178
			EXAMPLE If P178 = 29.17 and actual frequency = 60 Hz, then Drive displays 1750 (rpm)			
P179	Run Screen Display	0	0	{Parameter Number}	599	• 0 = Normal Run Screen, this display depends on mode of operation. Refer to section 4.2. • Other selections choose a diagnostic parameter to display (P501…P599). • Parameters P560 - P564 are selectable if the sequencer is enabled (P700 is not 0). P560-P564 are not visible until P700 is enabled.
P180	Oscillation Damping Control	0	0		80	0 = Damping disabled Compensation for resonances within drive
P181	Skip frequency 1	0.0	0.0	{Hz}	500	• Drive will not run in the defined skip range; used to skip over frequencies that cause mechanical vibration • P181 and P182 define the start of the skip ranges • P184 > 0 defines the bandwidth of both ranges.
P182	Skip frequency 2	0.0	0.0	{Hz}	500	
P184	Skip frequency bandwidth	0.0	0.0	{Hz}	10.0	
			NOTE Bandwidth (Hz) = f_s (Hz) + P184 (Hz) f_s = P181 or P182 EXAMPLE: P181 = 18 Hz and P184 = 4 Hz; skip range is from 18 to 22 Hz			
P185	Voltage Midpoint V/Hz characteristic	0	0.0	{V}	P165	Valid only when P300 = 0 or 2. Use with P187 to define midpoint on V/Hz curve.
P187 (2)	Frequency Midpoint V/Hz characteristic	0.0	0.0	{Hz}	P167	Valid only when P300 = 0 or 2. Use with P185 to define midpoint on V/Hz curve.
P189 (3)	Integrated Dynamic Brake		0 Disabled 1 Enabled			

(2) Parameter applicable to SMV models 15HP (11kW) and higher.

(3) Parameter applicable to SMV models 40HP (30kW) and higher.

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P190	Motor Braking		0 Disabled	Flux brake OFF.
			1 Braking with BUS threshold	When drive is in deceleration and $V_{bus} > V_{deceleration\ freeze}$ (114% of the rated V_{bus}), the flux brake will be turned ON.
			2 Braking always on with deceleration	As long as drive is in deceleration, the flux brake will be ON.
			3 Braking with bus regulator	When drive is in deceleration and $V_{bus} > V_{deceleration\ freeze}$ (114% of the rated V_{bus}), the motor speed will be increased to reduce the bus voltage. Determined by the value in P191, the speed increment = slip speed * P191(%) / 37.
			4 Special	(Consult factory before using)
		⚠	**WARNING** Flux braking can cause heat in the motor. To avoid damage to the motor, use a PTC to protect the motor. If the flux brake is used too frequently, the drive will trip fault "F_PF".	
P191	Motor Brake Level	0	0 {%} 75 (flux braking disabled)	Active when P190 > 0 and drive is in deceleration mode. Use to reduce deceleration time on high inertia loads. **NOTE:** Over usage of P190 can cause frequent 'overload' trips "F.PF" Not active for P300 = 5 (Torque mode)
P192	Motor Braking Deceleration Reduction Level	0.0	0 P167 (base freq) Raising the value of P191 reduces the drive deceleration rate during flux braking.	Active when P190 > 0 and P192 > 0.0, Drive is in deceleration mode. Use to reduce deceleration time on high inertia loads. **NOTE**: Usage of P192 can cause the drive to decelerate faster than settings in P105/P127. Not active for P300 = 5 (Torque mode)
P194	Password	0	0000 9999	• Must enter password to access parameters • P194 = 0000: Disables password
P197	Clear Fault History	0	0 No Action	
			1 Clear Fault History	
P199	Program Selection		0 Operate from User settings	
			1 Operate from OEM settings	Refer to Notes 1, 2 and 3
			2 Reset to OEM default settings	Refer to Note 1
			3 Reset to 60 Hz default settings	• Refer to Note 4 • Parameters are reset to the defaults listed in this manual. • For P199=4, the following exceptions apply: - P103, P152, P161, P167 = 50.0 Hz - P165 = 400V (400/480V drives only) - P304 = 50 Hz - P305 = 1450 RPM - P107 = 0 (480 V drives only)
			4 Reset to 50 Hz default settings	
			5 Translate	Refer to Note 5
		⚠	**WARNING!** Modification of P199 can affect drive functionality! STOP and EXTERNAL FAULT circuitry may be disabled! Check P100 and P121...P124	
		ℹ	**NOTE 1** If the EPM does not contain valid OEM settings, a flashing CF will be displayed when P199 is set to 1 or 2. **NOTE 2** When P199 is set to 1, the drive operates from the OEM settings stored in the EPM Module and no other parameters can be changed (CE will be displayed if attempted). **NOTE 3** Auto Calibration is not possible when operating from OEM Settings. **NOTES 4 and 5 - on next page.**	

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P199	Program Selection		**NOTE 4** Resetting to 50 and 60 Hz default settings will set the Assertion Level (P120) to "2" (High). P120 may need to be reset for the digital input devices being used. An F_AL fault may occur if P120 and the Assertion switch are not set identically. **NOTE 5** If an EPM that contains data from a previous compatible software version is installed: • The drive will operate according to the previous data, but parameters cannot be changed (cE will be displayed if attempted) • To update the EPM to the current software version, set P199 = 5. The parameters can now be changed but the EPM is incompatible with previous software revisions.	

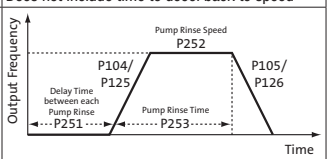
4.5.4 PID Parameters

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P200	PID Mode	0	0 Disabled 1 Normal-acting 2 Reverse-acting 3 Normal-acting, Bi-directional 4 Reverse-acting, Bi-directional	• Normal-acting: As feedback increases, motor speed decreases • Reverse-acting: As feedback increases, motor speed increases • PID mode is disabled in Vector Torque mode (P300 = 5) • Selections 3, 4: If P112=1, PID controller output sets the speed, (range -max freq to +max freq)
			NOTE To activate PID mode, one of the TB-13 inputs (P121...P124) must be used to select the Auto Reference that matches the desired PID setpoint reference. If the selected PID setpoint reference uses the same analog signal as the PID feedback (P201), an F_IL fault will occur. **Example:** The desired PID setpoint reference is the keypad (▲ and ▼). Set TB-13x = 6 (Auto Reference: Keypad): • TB-13x = closed: PID mode is active • TB-13x = open: PID mode is disabled and the drive speed will be controlled by the reference selected in P101.	
P201	PID Feedback Source	0	0 4-20 mA (TB-25) 1 0-10 VDC (TB-5) 2 Drive Load (P507) 3 Feedback from Network	Must be set to match the PID feedback signal
P202	PID Decimal Point	1	0 PID Display = XXXX 1 PID Display = XXX.X 2 PID Display = XX.XX 3 PID Display = X.XXX 4 PID Display = .XXXX	Applies to P204, P205, P214, P215, P231...P233, P242, P522, P523
P203 (2)	PID Units	0	0 % 1 /UNITS 2 AMPS 3 NONE	Select the UNITS LED that will be illuminated when the drive is running in PID control mode
P204	Feedback at Minimum Signal	0.0	-99.9 3100.0	Set to match the range of the feedback signal being used
P205	Feedback at Maximum Signal	100.0	-99.9 3100.0	**Example:** Feedback signal is 0 - 300 PSI; P204 = 0.0, P205 = 300.0

(2) Parameter applicable to SMV models 15HP (11kW) and higher.

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P207	Proportional Gain	5.0	0.0	{%}	1000.0	Used to tune the PID loop: • Increase P207 until system becomes unstable, then decrease P207 by 10-15% • Next, increase P208 until feedback matches setpoint • If required, increase P209 to compensate for sudden changes in feedback
P208	Integral Gain	0.0	0.0	{s}	20.0	
P209	Derivative Gain	0.0	0.0	{s}	20.0	
			NOTE • Derivative Gain is very sensitive to noise on the feedback signal. Use with care. • Derivative Gain is not normally required in pump and fan applications			
P210	PID Setpoint Ramp	20.0	0.0	{s}	100.0	• time of setpoint change from P204 to P205 or vice versa. • Used to smooth the transition from one PID setpoint to another, such as when using the Preset PID Setpoints (P231...P233)
P214	Minimum Alarm	0.0	P204		P205	Use with P140, P142 = 18...23
P215	Maximum Alarm	0.0	P204		P205	
P231	Preset PID Setpoint #1	0.0	P204		P205	TB-13A activated; P121 = 3 and P200 = 1 or 2
P232	Preset PID Setpoint #2	0.0	P204		P205	TB-13B activated; P122 = 3 and P200 = 1 or 2
P233	Preset PID Setpoint #3	0.0	P204		P205	TB-13C activated; P123 = 3 and P200 = 1 or 2
P234	Preset PID Setpoint #4	0.0	P204		P205	TB-13D activated; P124 = 3 and P200 = 1 or 2
P240	Sleep Threshold	0.0	0.0	{Hz}	500.0	• If drive speed < P240 for longer than P241, output frequency = 0.0 Hz; drive display = SLP • P240 = 0.0: Sleep mode is disabled. • P200 = 0…2: Drive will start again when speed command is above P240 • P242 > 0.0: Drive will restart when the PID feedback differs from the setpoint by more than the value of P242 **or** when the PID loop requires a speed above P240.
P241	Sleep Delay	30.0	0.0	{s}	300.0	
P242	Sleep Bandwidth	0.0	0.0 Where: B_{max} = |(P205 - P204)|		B_{max}	
P243	Feedback Sleep Entry Threshold	0.0	P204		P205	Active only when P244 = 1 or 2
P244	Sleep Entry Mode	0	0 Enter SLEEP if Drive Speed <P240			For time longer than P241
			1 Enter SLEEP if Feedback >P243			For time longer than P241 or same as Sel 0
			2 Enter SLEEP if Feedback <P243			For time longer than P241 or same as Sel 0
P245	Sleep Entry Stop Type	0	0 Coast to Stop			
			1 Ramp to Stop			
			2 Stop with P111 settings			
P246	Feedback Recovery from Sleep Threshold	0.0	P204		P205	Active only when P247 = 1 or 2
P247	Sleep Recovery Mode	0	0 Recovery if Speed Setpoint > P240 or if PID feedback differs from setpoint by more than P242			
			1 Recovery only if Feedback < P246			
			2 Recovery only if Feedback > P246			

(2) Parameter applicable to SMV models 15HP (11kW) and higher.

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P250	Auto Rinse in Sleep Mode	0	0 Disabled 1 Enabled			Activated in sleep mode only. Sleep Recovery cancels Auto Rinse
P251	Time Delay between Auto Rinses	30.0	0.0	{min}	6553.5	Time delay reset by re/entering sleep mode
P252	Auto Rinse Speed	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign = reverse direction
P253	Auto Rinse Time	0.0	0.0	{sec}	6553.5	Does not include time to decel back to speed
			Auto Pump Rinse Setup: P250=1 (Enabled) P251=# minutes between each PumpRinse P252=Hz speed of Pump Rinse P253=# seconds Pump Rinse duration			
P280	Current Level: Flying Restart Type 2	70.0	0.0	{%}	P171	Maximum current during Type 2 flying restart operation
P281	Decel Time: Flying Restart Type 2	3.0	0.0	{sec}	3600.0	Deceleration rate used during Type 2 flying restart operation

4.5.5 Vector Parameters

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P300 (1)	Drive Mode	0	0 Constant V/Hz			Constant torque V/Hz control for general applications
			1 Variable V/Hz			Variable torque V/Hz control for centrifugal pump and fan applications
			2 Enhanced Constant V/Hz 3 Enhanced Variable V/Hz			For single or multiple motor applications that require better performance than settings 0 or 1, but cannot use Vector mode, due to: • Missing required motor data • Vector mode causing unstable motor operation
			4 Vector Speed			For single-motor applications requiring higher starting torque and speed regulation
			5 Vector Torque			For single-motor applications requiring torque control independent of speed
			NOTE To configure the drive for either Vector mode or Enhanced V/Hz mode: • P300 = 4, 5: - Set P302...P306 according to motor nameplate - Set P399 = 1 or 2 (if option 1 failed or in case of non-standard motor) - Make sure motor is cold (20° - 25° C) and apply a Start command - Display will indicate CAL for about 40 seconds - Once the calibration is complete, the display will indicate StoP; apply another Start command to actually start the motor - If an attempt is made to start the drive in Vector or Enhanced V/Hz mode before performing the Motor Calibration, the drive will display F_n Id and will not operate • P300 = 2, 3: Same as above but only need to set P302…P304			
P302 (1)	Motor Rated Voltage		0	{V}	600	• Default setting = drive rating • Set to motor nameplate data
P303 (1)	Motor Rated Current		0.1	{A}	500.0	

(1) Any changes to this parameter will not take effect until the drive is stopped.

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
P304 (1)	Motor Rated Frequency	60	0	{Hz}	1000	Set to motor nameplate data
P305 (1)	Motor Rated Speed	1750	300	{RPM}	65000	
P306 (1)	Motor Cosine Phi	0.80	0.40		0.99	
			NOTE If motor cosine phi is not known, use one of the following formulas: cos phi = motor Watts / (motor efficiency X P302 X P303 X 1.732) cos phi = cos [$\sin^{-1}$ (magnetizing current / motor current)]			
P310 (1)	Motor Stator Resistance		0.00	{Ω}	64.00	• P310, 311 default setting depends on drive rating • Will be automatically programmed by P399 • Changing these settings can adversely affect performance. Contact factory technical support prior to changing
P311 (1)	Motor Stator Inductance		0.0	{mH}	2000	
P315	Dead Time Compensation Factor	0.0	-50.0	{%}	+50.0	• Adjust dead time correction from internal default • Takes effect when P399 = 3.
P330	Torque Limit	100	0	{%}	400	When P300 = 5, sets the maximum output torque.
P331	Preset Torque Setpoint #1	100	0	{%}	400	TB-13A activated; P121 = 3 and P300 = 5
P332	Preset Torque Setpoint #2	100	0	{%}	400	TB-13B activated; P122 = 3 and P300 = 5
P333	Preset Torque Setpoint #3	100	0	{%}	400	TB-13C activated; P123 = 3 and P300 = 5
P334 (2)	Preset Torque Setpoint #4	100	0	{%}	400	TB-13D activated; P124 = 3 and P300 = 5
P340 (1)	Current Loop P Gain	0.25	0.00		16.0	Changing these settings can adversely affect performance. Contact factory technical support prior to changing.
P341 (1)	Current Loop I Gain	65	12	{ms}	9990	
P342 (1)	Speed Loop Adjust	0.0	0.0	{%}	20.0	
P343	Slip Compensation Response Filter	99	90	{ms}	9999	Low pass filter time constant for varying the slip compensation response to changes in the motor current.
P399	Motor Auto-calibration	0	0 Calibration Not Done 1 Standard Calibration Enabled 2 Advanced Calibration Enabled 3 Bypass Calibration, enable operation in vector mode w/o Auto Calibration 4 Standard Calibration Complete 5 Advanced Calibration Complete			• If P300 = 4 or 5, motor calibration must be performed if P399 is not set to 3 (bypass calibration). • If P300=2 or 3, motor calibration is recommended. • Use option 2 if option 1 failed or in case of non-standard motors • An alternating **CAL** / **Err** will occur if: - attempt motor calibration with P300 = 0 or 1 - motor calibration is attempted before programming motor data
			NOTE: To run the Auto Calibration: – Set P302...P306 according to motor nameplate – Set P399 = 1 or 2 (if option 1 failed or in case of non-standard motor) – Make sure motor is cold (20° - 25° C) – Apply a Start command – Display will indicate **CAL** for about 40 seconds – Once the calibration is complete, the display will indicate **Stop**; apply another Start command to actually start the motor – Parameter P399 will now be set to 4 or 5.			

(1) Any changes to this parameter will not take effect until the drive is stopped.

(2) Parameter applicable to SMV models 15HP (11kW) and higher.

4.5.6 Network Parameters

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P400	Network Protocol		0 Not Active	This parameter setting is based upon the network or I/O module that is installed.
			1 Remote Keypad	
			2 Modbus RTU	
			3 CANopen	
			4 DeviceNet	
			5 Ethernet	
			6 Profibus	
			7 Lecom-B	
			8 I/O Module	
P401	Module Type Installed	0	0 No Module Installed	Module type format: 0xAABC; Drive Display: AA.B.C AA = Module Type B = Major revision C = minor revision
			1 Basic I/O (0x0100, 1.0.0)	
			2 RS485/Rem. Keypad (0x0200, 2.0.0)	
			3 CANopen (0x0300, 3.0.0)	
			11 PROFIBUS (0x1100, 11.0.0)	
			12 Ethernet (0x1200, 12.0.0)	
P402	Module Status	0	0 Not Initialized	
			1 Initialization: Module to EPM	
			2 Initialization: EPM to Module	
			3 Online	
			4 Failed Initialization Error	
			5 Time-out Error	
			6 Initialization Failed	Module type mismatch P401
			7 Initialization Error	Protocol selection mismatch P400
P403	Module Reset	0	0 No Action	Returns module parameters 401…499 to the default values shown in the manual
			1 Reset parameters to default values	
P404	Module Timeout Action	3	0 No Fault	Action to be taken in the event of a Module/ Drive Time-out. Time is fixed at 200ms STOP is by the method selected in P111.
			1 STOP (see P111)	
			2 Quick Stop	
			3 Fault (F_ntF)	
P405	Current Network Fault		0 No Fault	
			1 F.nF1	NetIdle Mode
			2 F.nF2	Loss of Ethernet I/O connection
			3 F.nF3	Network Fault
			4 F.nF4	Explicit Message Timeout
			5 F.nF5	Overall Network Timeout
			6 F.nF6	Overall Explicit Timeout
			7 F.nF7	Overall I/O Message Timeout
P406	Proprietary			Manufacturer specific
P407 … P499		Module Specific Parameters		Refer to the Communications Reference Guide specific to the network or I/O module installed.

4.5.7 Diagnostic Parameters

Code No.	Name	Display Range (READ ONLY)			IMPORTANT
P500	Fault History				• Displays the last 8 faults • Format: n.xxx where: n = 1..8, 1 is the newest fault; xxx = fault message (w/o the **F.**) • Refer to section 5.3
P501	Software Version				Format: x.yz
P502	Drive ID				A flashing display indicates that the Drive ID stored in the EPM does not match the drive model it is plugged into.
P503	Internal Code				Alternating Display: xxx-; -yy
P505	DC Bus Voltage	0	{VDC}	1500	
P506	Motor Voltage	0	{VAC}	1000	
P507	Load	0	{%}	255	Motor load as % of drive's output current rating. Refer to section 2.3.
P508	Motor Current	0.0	{A}	1000	Actual motor current
P509	Torque	0	{%}	500	Torque as % of motor rated torque (vector mode only)
P510	Output Power kW	0.00	{kW}	650.0	
P511	Total kWh	0.0	{kWh}	9999999	Alternating display: xxx-; yyyy when value exceeds 9999
P512	Heatsink Temp	0	{°C}	150	Heatsink temperature
P520	0-10 VDC Input	0.0	{VDC}	10.0	Actual value of signal at TB-5 (See P162)
P521	4-20 mA Input	0.0	{mA}	20.0	Actual value of signal at TB-25 (See P162)
P522	TB-5 Feedback	P204		P205	TB-5 signal value scaled to PID feedback units (See P162)
P523	TB-25 Feedback	P204		P205	TB-25 signal value scaled to PID feedback units (See P162)
P524	Network Feedback	P204		P205	Network signal value scaled to PID feedback units
P525	Analog Output	0	{VDC}	10.0	Refer to P150…P155
P527	Actual Output Frequency	0	{Hz}	500.0	
P528	Network Speed Command	0	{Hz}	500.0	Command speed if (Auto: Network) is selected as the speed source
P530	Terminal and Protection Status				Indicates terminal status using segments of the LED display. (Refer to section 4.5.7.1)
P531	Keypad Status				Indicates keypad button status using segments of the LED display. (Refer to section 4.5.7.2)
P540	Total Run Time	0	{h}	9999999	Alternating display: xxx-; yyyy when value exceeds 9999
P541	Total Power On Time	0	{h}	9999999	
P550	Fault History	1		8	• Displays the last 8 faults • Format: n.xxx where: n = 1..8, 1 is the newest fault; xxx = fault message (w/o the **F.**) • Refer to section 5.3
P551	Fault History Time	0	{h}	999999	Display: "n.hh-" "hhhh" "mm.ss" = fault #, hours, seconds The "hhhh" screen is displayed after hours exceed 999.
P552	Fault History Counter	0		255	Number of sequential occurrences of a fault. For example: 3 external faults occur over a period of time with no other errors occurring. Then P552 will indicate 3, P550 will indicate the error EF and P551 will indicate the time of the first fault occurrence.

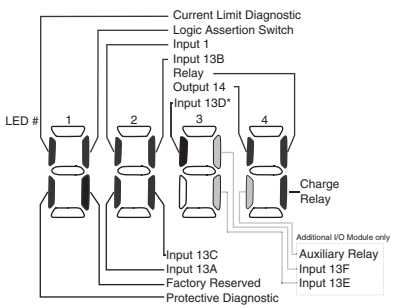
Code No.	Name	Display Range (READ ONLY)			IMPORTANT
P560	Sequencer: Currently Active Segment	0		17	
P561	Sequencer: Time since Start of Active Segment	0.0 0	{P708} {P708}	6553.5 65535	Unit depends on P708 (0.1sec, sec or minutes)
P562	Sequencer: Time Remaining in Active Segment	0.0 0	{P708} {P708}	6553.5 65535	Unit depends on P708 (0.1sec, sec or minutes)
P563	Sequencer: Number of cycles since start	0		65535	
P564	Sequencer: Number of cycles remaining	0		65535	
		NOTE: Parameters P560-P564 are visible only when P700 > 0 (i.e. the sequencer is enabled)			

4.5.7.1 Terminal & Protection Status Display

Parameter P530 allows monitoring of the control terminal points and common drive conditions:

An illuminated LED segment indicates:

- the protective circuit is active (LED 1)
- the Logic Assertion Switch is set to High (+)
- input terminal is asserted (LED 2)
- output terminal is energized (LED 4)
- the Charge Relay is not a terminal, this segment will be illuminated when the Charge Relay is energized (LED 4).



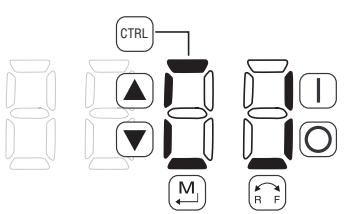
* Input 13D available on 15-60HP (11-45kW) models only

4.5.7.2 Keypad Status Display

Parameter P531 allows monitoring of the keypad pushbuttons:

An illuminated LED segment indicates when the button is depressed.

LED 1 and LED 2 are used to indicate pushbutton presses on a remote keypad that is attached to the drive. LED 3 and LED 4 indicate button presses on the local drive keypad.



4.5.8 Onboard Communications Parameters 15-60HP (11-45kW)

The P6xx Onboard Communication parameters are applicable to the 15HP (11kW) and higher models only.

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P600	Network Enable	0	0 Disabled 1 Remote Keypad 2 Modbus 7 Lecom	This parameter enables the onboard network communications.
			NOTE: Onboard Communications will be disabled if: - P600 = 0, or - P600 = 1 and P400 = 1, or - P600 = 2 and P400 = 2, 3, 4, 5, 6 or 7 - P600 = 7 and P400 = 2, 3, 4, 5, 6 or 7	If the onboard communications are disabled, the user will not have access to any of the other P6xx parameters.
P610	Network Address	1	1 - 247	Modbus
		1	1 - 99	Lecom
P611	Network Baud Rate	2	0 2400 bps 2 9600 bps 1 4800 bps 3 19200 bps	Modbus
		0	0 9600 bps 1 4800 bps 2 2400 bps 3 1200 bps 4 19200 bps	Lecom
P612	Network Data Format	0	0 8, N, 2 1 8, N, 1 2 8, E, 1 3 8, O, 1	Modbus Only
P620	Network Control Level	0	0 Monitor Only 1 Parameter Programming 2 Programming and Setpoint Control 3 Full Control	Lecom Only
P624	Network Powerup Start Status	0	0 Quick Stop 1 Controller Inhibit	Lecom Only
P625	Network Timeout	10.0	0.0 - 300.0 seconds	Modbus
		50	0 - 65000 milliseconds	Lecom
P626	Network Timeout Action	4	0 No action 1 Stop (P111) 2 Quick Stop 3 Controller Inhibit 4 Trip Fault, F.nF1	Modbus
		0	0 No action 1 Controller Inhibit 2 Quick Stop 3 Trip Fault, F.nF1	Lecom
P627	Network Messages Received		Read-Only: 0 - 9999	Valid network messages received
			NOTE: When the number of messages exceeds 9999, the counter resets and resumes counting from 0.	

4.5.9 Sequencer Parameters

The P700 Sequencer parameters are listed herein. Refer to section 4.5.7 for P56x Sequencer Diagnostic Parameters. The sequencer function consists of 16 step segments, each individual step segment can have its own ramp time, time spent in individual segment and output frequency entered. The sequencer has 3 different modes to control how the drive moves through each individual step segment: Timer Transition, Step Sequence or Timer and Step Sequence.

P700= 1 (Timer Transition)

Starting at the segment number entered in the "Start Segment" parameter, the drive will automatically move through each of the segments. The time spent in each segment is determined by the values set in the individual "Time in Current Step" parameters.

P700= 2 (Step Sequence)

Starting at the segment number entered in the "Start Segment" parameter the sequencer will only move to the next segment when a rising edge is applied to the highest priority digital input which is programmed to "Step Sequence" selection "24".

P700= 3 (Timer Transition or Step Sequence)

Starting at the segment number entered in the "Start Segment" parameter, the drive will automatically move through each of the segments. The time spent in each segment is determined by the values set in the individual "Time in Current Step" parameters, however if a rising edge is applied to the highest priority digital input which is programmed to "Step Sequence" selection "24" it will force the sequencer to step into the next segment.

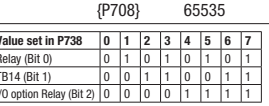
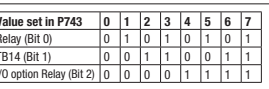
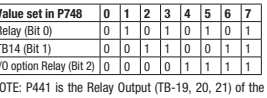
NOTE: A value of "0" in the "Time in current step" parameter (ex: P712), will result in the segment being skipped.

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P700	Sequencer Mode	0	0 Disabled 1 Enabled: transition on timer only 2 Enabled: transition on rising edge (P121, 122, 123 = 25 step sequence) 3 Enabled: transition on timer or rising edge	If P700 = 0 and no reference (P121, P101) points to any of the sequence segments, then P701-P799 will not be displayed on the local keypad.
P701	Sequencer: TB13A Trigger Segment	1	1 - 16 TB13A = lowest priority	Asserting TB13A with selection #24 (Start Sequence), starts the sequence operation from the segment specified in this parameter.
P702	Sequencer: TB13B Trigger Segment	1	1 - 16 TB13B: higher priority than TB13A	Asserting TB13B with selection #24 (Start Sequence), starts the sequence operation from the segment specified in this parameter.
P703	Sequencer: TB13C Trigger Segment	1	1 - 16 TB13C: higher priority thanTB13B, A	Asserting TB13C with selection #24 (Start Sequence), starts the sequence operation from the segment specified in this parameter.
P704(2)	Sequencer: TB13D Trigger Segment	1	1 - 16 TB13D: higher priority than TB13C, B, A	Asserting TB13D with selection #24 (Start Sequence), starts the sequence operation from the segment specified in this parameter.
P706	Sequencer: Action after Stop/Start transition or Fault Restart	0	0 Restart at beginning of sequence 1 Restart at beginning of current seg 2 Start at beginning of prior segment 3 Start at beginning of next segment	Pointed by TB13x
P707	Sequencer: Number of cycles	1	1 65535	1 = single scan; 65535 = continuous loop

(2) Parameter applicable to SMV models 15HP (11kW) and higher.

<table>
<tr><th colspan="2">Code</th><th colspan="4">Possible Settings</th><th rowspan="2">IMPORTANT</th></tr>
<tr><th>No.</th><th>Name</th><th>Default</th><th colspan="3">Selection</th></tr>
<tr><td rowspan="2">P708</td><td rowspan="2">Sequencer: Time units/scaling</td><td>0</td><td colspan="3">0 0.1 {sec} 6553.5
1 1 {sec} 65535
2 1 {min} 65535</td><td>Setup units/scaling for all sequencer time related parameters</td></tr>
<tr><td></td><td colspan="4">NOTE:
P708 rescales the following sequencer related parameters:
- Segment Times in current step: P712, P717, P722, P727, P732, P737, P742, P747, P752, P757, P762, P767, P772, P777, P782, P787, P792
- Sequence diagnostic/status: P561, P562</td></tr>
<tr><td></td><td colspan="6">Segment #1</td></tr>
<tr><td>P710</td><td>Segment #1 Frequency Setpoint</td><td>0.0</td><td>-500.0</td><td>{Hz}</td><td>500.0</td><td>If P112 = 1, negative sign forces reverse direction</td></tr>
<tr><td>P711</td><td>Segment #1 Accel/Decel Time</td><td>20.0</td><td>0.0</td><td>{sec}</td><td>3600.0</td><td></td></tr>
<tr><td>P712</td><td>Segment #1 Time in current step</td><td>0.0
0</td><td>0.0
0</td><td>{P708}
{P708}</td><td>6553.5
65535</td><td>Scaling/units depend on P708
Skip segment if time = 0</td></tr>
<tr><td>P713</td><td>Segment #1 Digital Output State</td><td>0</td><td colspan="3"><table><tr><th>Value set in P713</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><td>Relay (Bit 0)</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>TB14 (Bit 1)</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>I/O option Relay (Bit 2)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table>NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).</td><td>bit = 0: OFF (De-energized)
bit = 1: ON (Energized)
The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27</td></tr>
<tr><td>P714</td><td>Segment #1 TB30 Analog Output Value</td><td>0.00</td><td>0.00</td><td>{VDC}</td><td>10.00</td><td>TB30 configuration parameter must be set to accept this value: P150 = 10</td></tr>
<tr><td></td><td colspan="6">Segment #2</td></tr>
<tr><td>P715</td><td>Segment #2 Frequency Setpoint</td><td>0.0</td><td>-500.0</td><td>{Hz}</td><td>500.0</td><td>If P112 = 1, negative sign forces reverse direction</td></tr>
<tr><td>P716</td><td>Segment #2 Accel/Decel Time</td><td>20.0</td><td>0.0</td><td>{sec}</td><td>3600.0</td><td></td></tr>
<tr><td>P717</td><td>Segment #2 Time in current step</td><td>0.0
0</td><td>0.0
0</td><td>{P708}
{P708}</td><td>6553.5
65535</td><td>Scaling/units depend on P708
Skip segment if time = 0</td></tr>
<tr><td>P718</td><td>Segment #2 Digital Output State</td><td>0</td><td colspan="3"><table><tr><th>Value set in P718</th><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><td>Relay (Bit 0)</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>TB14 (Bit 1)</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>I/O option Relay (Bit 2)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table>NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).</td><td>bit = 0: OFF (De-energized)
bit = 1: ON (Energized)
The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27</td></tr>
<tr><td>P719</td><td>Segment #2 TB30 Analog Output Value</td><td>0.00</td><td>0.00</td><td>{VDC}</td><td>10.00</td><td>TB30 configuration parameter must be set to accept this value: P150 = 10</td></tr>
</table>

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
	Segment #3					
P720	Segment #3 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P721	Segment #3 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P722	Segment #3 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P723	Segment #3 Digital Output State	0	**Value set in P723**: 0 1 2 3 4 5 6 7 Relay (Bit 0): 0 1 0 1 0 1 0 1 TB14 (Bit 1): 0 0 1 1 0 0 1 1 I/O option Relay (Bit 2): 0 0 0 0 1 1 1 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P724	Segment #3 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #4					
P725	Segment #4 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P726	Segment #4 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P727	Segment #4 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P728	Segment #4 Digital Output State	0	**Value set in P728**: 0 1 2 3 4 5 6 7 Relay (Bit 0): 0 1 0 1 0 1 0 1 TB14 (Bit 1): 0 0 1 1 0 0 1 1 I/O option Relay (Bit 2): 0 0 0 0 1 1 1 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P729	Segment #4 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #5					
P730	Segment #5 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P731	Segment #5 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P732	Segment #5 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P733	Segment #5 Digital Output State	0	**Value set in P733**: 0 1 2 3 4 5 6 7 Relay (Bit 0): 0 1 0 1 0 1 0 1 TB14 (Bit 1): 0 0 1 1 0 0 1 1 I/O option Relay (Bit 2): 0 0 0 0 1 1 1 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P734	Segment #5 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
	Segment #6					
P735	Segment #6 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P736	Segment #6 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P737	Segment #6 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P738	Segment #6 Digital Output State	0	 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P739	Segment #6 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #7					
P740	Segment #7 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P741	Segment #7 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P742	Segment #7 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P743	Segment #7 Digital Output State	0	 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P744	Segment #7 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #8					
P745	Segment #8 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P746	Segment #8 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P747	Segment #8 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P748	Segment #8 Digital Output State	0	 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P749	Segment #8 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10

Value set in P738	0	1	2	3	4	5	6	7
Relay (Bit 0)	0	1	0	1	0	1	0	1
TB14 (Bit 1)	0	0	1	1	0	0	1	1
I/O option Relay (Bit 2)	0	0	0	0	1	1	1	1

Value set in P743	0	1	2	3	4	5	6	7
Relay (Bit 0)	0	1	0	1	0	1	0	1
TB14 (Bit 1)	0	0	1	1	0	0	1	1
I/O option Relay (Bit 2)	0	0	0	0	1	1	1	1

Value set in P748	0	1	2	3	4	5	6	7
Relay (Bit 0)	0	1	0	1	0	1	0	1
TB14 (Bit 1)	0	0	1	1	0	0	1	1
I/O option Relay (Bit 2)	0	0	0	0	1	1	1	1

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
	Segment #9					
P750	Segment #9 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P751	Segment #9 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P752	Segment #9 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P753	Segment #9 Digital Output State	0	**Value set in P753** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P754	Segment #9 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #10					
P755	Segment #10 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P756	Segment #10 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P757	Segment #10 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P758	Segment #10 Digital Output State	0	**Value set in P758** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P759	Segment #10 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #11					
P760	Segment #11 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P761	Segment #11 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P762	Segment #11 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P763	Segment #11 Digital Output State	0	**Value set in P763** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P764	Segment #11 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10

Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
	Segment #12					
P765	Segment #12 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P766	Segment #12 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P767	Segment #12 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P768	Segment #12 Digital Output State	0	**Value set in P768** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P769	Segment #12 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #13					
P770	Segment #13 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P771	Segment #13 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P772	Segment #13 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P773	Segment #13 Digital Output State	0	**Value set in P773** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P774	Segment #13 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #14					
P775	Segment #14 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P776	Segment #14 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P777	Segment #14 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P778	Segment #14 Digital Output State	0	**Value set in P778** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P779	Segment #14 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10

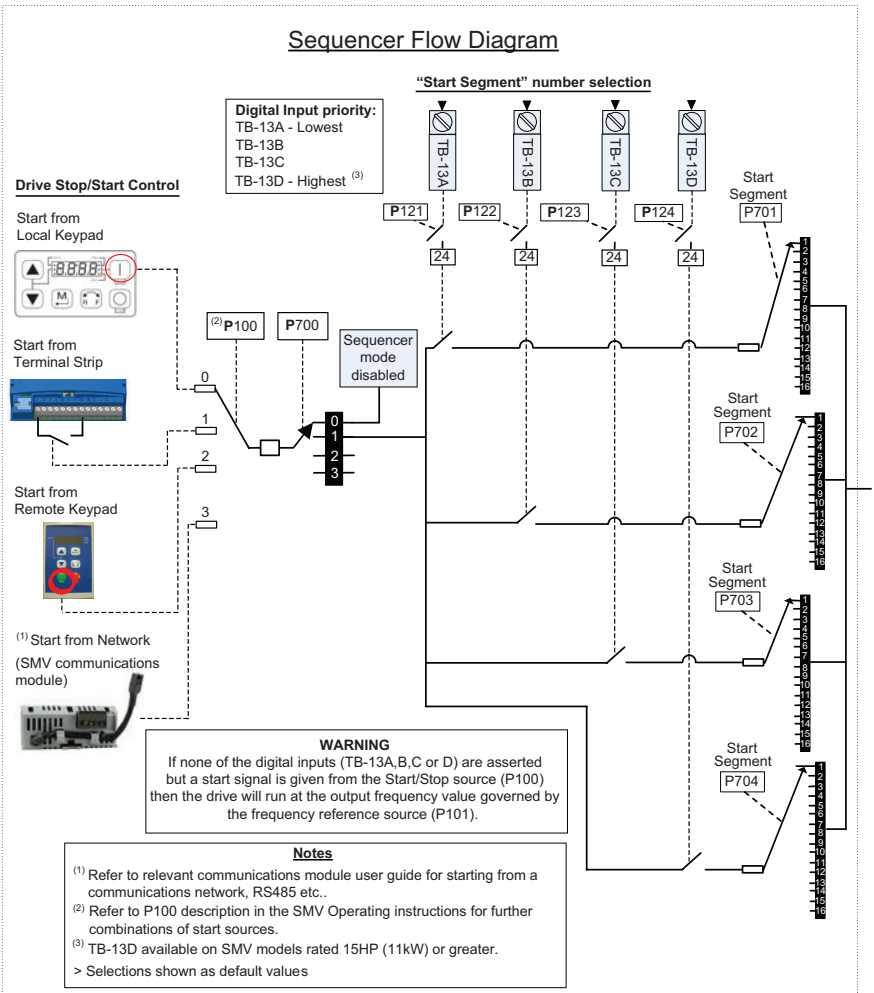
Code		Possible Settings				IMPORTANT
No.	Name	Default	Selection			
	Segment #15					
P780	Segment #15 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P781	Segment #15 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P782	Segment #15 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P783	Segment #15 Digital Output State	0	**Value set in P783** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P784	Segment #15 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	Segment #16					
P785	Segment #16 Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P786	Segment #16 Accel/Decel Time	20.0	0.0	{sec}	3600.0	
P787	Segment #16 Time in current step	0.0 0	0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708 Skip segment if time = 0
P788	Segment #16 Digital Output State	0	**Value set in P788** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27
P789	Segment #16 TB30 Analog Output Value	0.00	0.00	{VDC}	10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
	End Segment					
P790	End Segment: Frequency Setpoint	0.0	-500.0	{Hz}	500.0	If P112 = 1, negative sign forces reverse direction
P791	End Segment: Accel/Decel Time	5.0	0.0	{sec}	3600.0	
P792	End Segment: Delay before P793, 794 & 795 activation		0.0 0	{P708} {P708}	6553.5 65535	Scaling/units depend on P708
P793	End Segment: Digital Output State		**Value set in P793** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** Relay (Bit 0) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 TB14 (Bit 1) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 I/O option Relay (Bit 2) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 NOTE: P441 is the Relay Output (TB-19, 20, 21) of the optional Digital I/O module (ESVZAL0, ESVZAL1).			bit = 0: OFF (De-energized) bit = 1: ON (Energized) The corresponding digital output/relay must be set to accept data from the sequencer: P140, P142, P441 = 27

Code		Possible Settings		IMPORTANT
No.	Name	Default	Selection	
P794	End Segment: TB30 Analog Output Value	0.00	0.00 {VDC} 10.00	TB30 configuration parameter must be set to accept this value: P150 = 10
P795	End Segment: Drive Action	0	0 Keep Running 1 Stop (based on P111) 2 Coast to Stop 3 Quick Stop (per P127) 4 Coast with DC Brake 5 Ramp with DC Brake	Recovery: Toggling the START SEQUENCE will start the cycle from 'end segment Stop' or 'end segment DC Brake'.
		⚠	**WARNING!** If P795 = 0 then toggling the start sequence input will also restart the sequencer cycle but in the interim where TB13X is open the drive will ramp to the standard or specified alternate speed source depending on the drive configuration.	

⚠ **WARNING**

If the input defined to "Start Sequence" is opened during a sequence, the drive will exit sequencer mode and will run at the specified standard or alternate speed source (dependent on drive configuration).

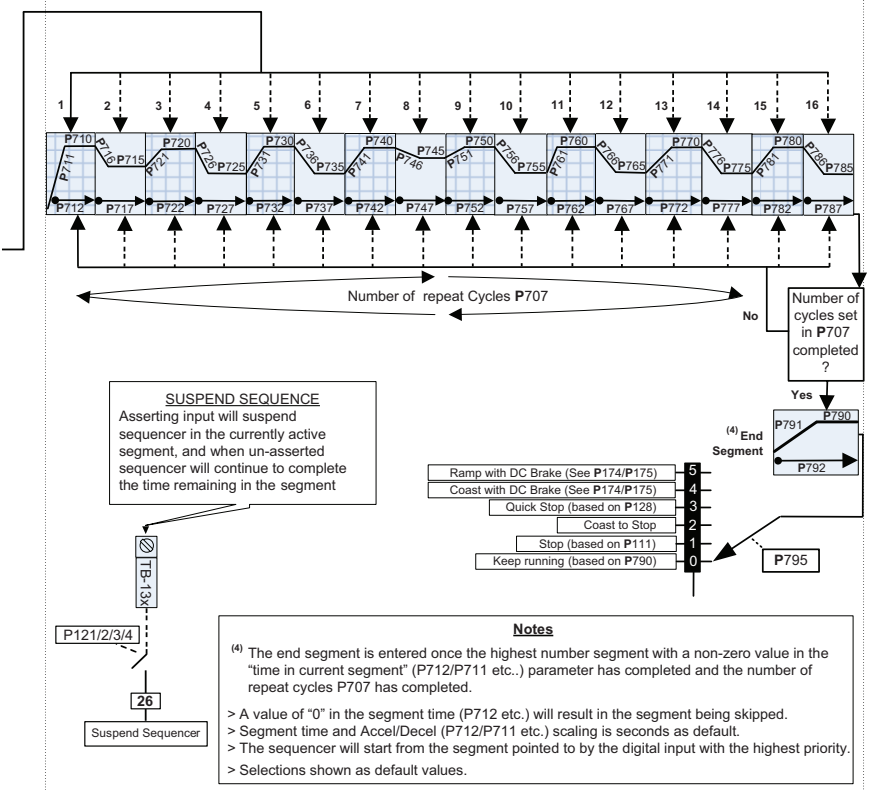
4.5.9.1 Sequencer Flow Diagram Left



WARNING
If the input defined to "Start Sequence" is opened during a sequence, the drive will exit sequencer mode and will run at the specified standard or alternate speed source (dependent on drive configuration).

4.5.9.2 Sequencer Flow Diagram Right

Action after Stop/Start (P100) transition/digital input (if setup for sequencer mode) transition or restart after trip.	
P706	**Action**
0	Restart at beginning of sequence (pointed by TB13x)
1	Restart at beginning of current segment
2	Start at beginning of prior segment
3	Start at beginning of next segment

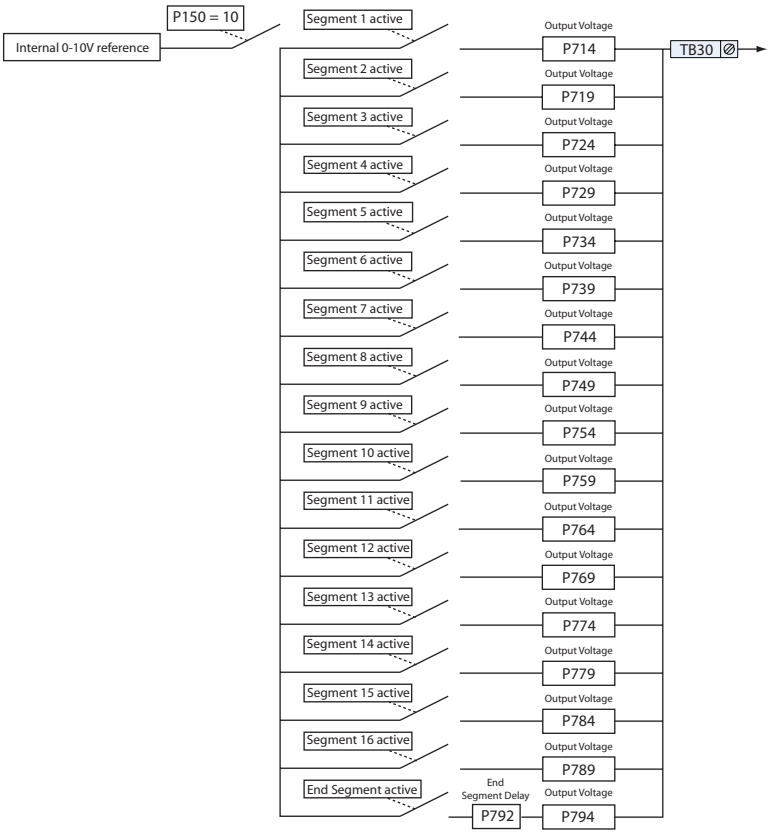


Notes

(4) The end segment is entered once the highest number segment with a non-zero value in the "time in current segment" (P712/P711 etc..) parameter has completed and the number of repeat cycles P707 has completed.

> A value of "0" in the segment time (P712 etc.) will result in the segment being skipped.
> Segment time and Accel/Decel (P712/P711 etc.) scaling is seconds as default.
> The sequencer will start from the segment pointed to by the digital input with the highest priority.
> Selections shown as default values.

4.5.9.3 Sequencer Status



NOTE
On the “End Segment”, the output voltage is not present until after the end segment delay P792 has expired. On the other segments the output voltage is present on entry to the segment. The same is true for the digital outputs.

(1) The drive can only be restarted if the error message has been reset.

5 Troubleshooting and Diagnostics

5.1 Status/Warning Messages

Status / Warning		Cause	Remedy
br	DC-injection brake active	DC-injection brake activated • activation of digital input (P121...P124 = 18) • automatically (P110 = 2, 4...6) • automatically (P111 = 1, 3)	Deactivate DC-injection brake • deactivate digital input • automatically after P175 time has expired
bF	Drive ID warning	The Drive ID (P502) stored on the EPM does not match the drive model.	• Verify motor data (P302…P306) and perform Auto Calibration. • Set drive mode (P300) to 0 or 1 • Reset the drive (P199 to 3 or 4) and reprogram.
CAL	Motor Auto-calibration active	Refer to P300, P399	Motor Auto-calibration is being performed
cE	An EPM that contains valid data from a previous software version has been installed	An attempt was made to change parameter settings	Parameter settings can only be changed after the EPM data is converted to the current version (P199 = 5)
CL	Current Limit (P171) reached	Motor overload	• Increase P171 • Verify drive/motor are proper size for application
dEC	Decel Override	The drive has stopped decelerating to avoid tripping into **HF** fault, due to excessive motor regen (2 sec max).	If drive trips into **HF** fault: • Increase P105, P126 • Install Dynamic Braking option
Err	Error	Invalid data was entered, or an invalid command was attempted	
FCL	Fast Current Limit	Overload	Verify drive/motor are proper size for application
FSt	Flying Restart Attempt after Fault	P110 = 5,6	
GE	OEM Settings Operation warning	An attempt was made to change parameter settings while the drive is operating in OEM Settings mode.	In OEM Settings mode (P199 = 1), making changes to parameters is not permitted.
GF	OEM Defaults data warning	An attempt was made to use (or reset to) the OEM default settings (P199 = 1 or 2) using an EPM without valid OEM data.	Install an EPM containing valid OEM Defaults data
LC	Fault Lockout	The drive attempted 5 restarts after a fault but all attempts were unsuccessful (P110 = 3...6)	• Drive requires manual reset • Check Fault History (P500) and correct fault condition
PdEC	PID Deceleration Status	PID setpoint has finished its ramp but the drive is still decelerating to a stop.	
PId	PID Mode Active	Drive has been put into PID Mode.	Refer to P200
SLP	Sleep Mode is active	Refer to P240...P242	
SP	Start Pending	The drive has tripped into a fault and will automatically restart (P110 = 3...6)	To disable Auto-Restart, set P110 = 0...2
SPd	PID Mode disabled.	Drive has been taken out of PID Mode. Refer to P200.	
StoP	Output frequency = 0 Hz (outputs U, V, W inhibited)	Stop has been commanded from the keypad, terminal strip, or network	Apply Start command (Start Control source depends on P100)

(1) The drive can only be restarted if the error message has been reset.

5.2 Drive Configuration Messages

When the Mode button is pressed and held, the drive's display will provide a 4-digit code that indicates how the drive is configured. If the drive is in a Stop state when this is done, the display will also indicate which control source commanded the drive to Stop (the two displays will alternate every second).

Configuration Display			
Format = x.y.zz	**x = Control Source:** L = Local Keypad t = Terminal Strip r = Remote Keypad n = Network	**y = Mode:** S = Speed mode P = PID mode t = Torque mode C = Sequencer mode	**zz = Reference:** CP = Keypad ▲ ▼ EU = 0-10 VDC (TB-5) E I = 4-20 mA (TB-25) JG = Jog nt = Network OP = MOP P 1 ... P7 = Preset 1...7 0 1 ... 16 = Sequencer Segment
	Example: L_S_CP = Local Keypad Start control, Speed mode, Keypad speed reference t_P_EU = Terminal Strip Start control, PID mode, 0-10 VDC setpoint reference t_C_ 12 = Terminal Strip Start control, Sequencer Operation (Speed mode), Segment #12 n_t_P2 = Network Start control, Vector Torque mode, Preset Torque #2 reference n_S_03 = Network Start control, Speed mode, Speed reference from Sequencer segment #03		
Stop Source Display			
Format = x_StP	L_StP = Stop command came from Local Keypad t_StP = Stop command came from Terminal Strip r_StP = Stop command came from Remote Keypad n_StP = Stop command came from Network		

5.3 Fault Messages

The messages below show how they will appear on the display when the drive trips. When looking at the Fault History (P500), the F_ will not appear in the fault message.

Fault		Cause	Remedy [1]
F_AF	High Temperature fault	Drive is too hot inside	• Reduce drive load • Improve cooling
F_AL	Assertion Level fault	• Assertion Level switch is changed during operation • P120 is changed during operation • P100 or P121...P124 are set to a value other than 0 and P120 does not match the Assertion Level Switch.	• Make sure the Assertion Level switch and P120 are both set for the type of input devices being used, prior to setting P100 or P121...P124. Refer to 3.2.3 and P120.
F_bF	Personality fault	Drive Hardware	• Cycle Power • Power down and install EPM with valid data • Reset the drive back to defaults (P199 = 3, 4) and then re-program • If problem persists, contact factory technical support
F_CF	Control fault	An EPM has been installed that is either blank or corrupted	
F_cF	Incompatible EPM fault	An EPM has been installed that contains data from an incompatible parameter version	
F_cFt	Forced Translation fault	An EPM from an old drive put in new drive causes drive to trip F_cFT fault.	Press [M] (mode button) twice to reset

Fault		Cause	Remedy [1]
F_dbF	Dynamic Braking fault	Dynamic braking resistors are overheating	• Increase active decel time (P105, P126, P127). • Check mains voltage and P107
F_EF	External fault	• P121…P124 = 21 and that digital input has been opened. • P121…P124 = 22 and that digital input has been closed.	• Correct the external fault condition • Make sure digital input is set properly for NC or NO circuit
F_F 1	EPM fault	EPM missing or defective	Power down and replace EPM
F_F2 … F_F 12	Internal faults		Contact factory technical support
F_Fnr	Control Configuration Fault	The drive is setup for REMOTE KEYPAD control (P100=2 or 5) but is not setup to communicate with a remote keypad	Set P400 = 1, or P600 = 1
		The drive is setup for NETWORK ONLY control (P100=3) but is not setup for network communications	Set P400 or P600 to a valid network communications protocol selection
F_FoL	TB25 (4-20 mA signal) Threshold fault	4-20 mA signal (at TB-25) drops below the value set in P164.	• Check signal/signal wire • Refer to parameters P163 and P164.
F_GF	OEM Defaults data fault	Drive is powered up with P199 =1 and OEM settings in the EPM are not valid.	Install an EPM containing valid OEM Defaults data or change P199 to 0.
F_HF	High DC Bus Voltage fault	Mains voltage is too high	Check mains voltage and P107
		Decel time is too short, or too much regen from motor	Increase active decel time (P105, P126, P127) or install Dynamic Braking option
F_ IL	Digital Input Configuration fault (P121... P124)	More than one digital input set for the same function	Each setting can only be used once (except settings 0 and 3)
		Only one digital input configured for MOP function (Up, Down)	One input must be set to MOP Up, another must be set to MOP Down
		PID mode is entered with setpoint reference and feedback source set to the same analog signal	Change PID setpoint reference (P121…P124) or feedback source (P201).
		One of the digital inputs (P121…P124) is set to 10 and another is set to 11…14.	Reconfigure digital inputs
		One of the digital inputs (P121…P124) is set to 11 or 12 and another is set to 13 or 14.	
		PID enabled in Vector Torque mode (P200 = 1 or 2 and P300 = 5)	PID cannot be used in Vector Torque mode
F_JF	Remote keypad fault	Remote keypad disconnected	Check remote keypad connections
F_LF	Low DC Bus Voltage fault	Mains voltage too low	Check mains voltage
F_n Id	No Motor ID fault	An attempt was made to start the drive in Vector or Enhanced V/Hz mode prior to performing the Motor Auto-calibration	Refer to parameters P300…P399 for Drive Mode setup and calibration.
F_nEF	Module communication fault	Communication failure between drive and Network Module.	Check module connections
F_nF 1 … F_nF9	Network Faults	Refer to the module documentation. for Causes and Remedies.	

Fault		Cause	Remedy [1]
F_OF	Output fault: Transistor fault	Output short circuit	Check motor/motor cable
		Acceleration time too short	Increase P104, P125
		Severe motor overload, due to: • Mechanical problem • Drive/motor too small for application	• Check machine / system • Verify drive/motor are proper size for application
		Boost values too high	Decrease P168, P169
		Excessive capacitive charging current of the motor cable	• Use shorter motor cables with lower charging current • Use low capacitance motor cables • Install reactor between motor and drive.
		Failed output transistor	Contact factory technical support
F_OF1	Output fault: Ground fault	Grounded motor phase	Check motor and motor cable
		Excessive capacitive charging current of the motor cable	Use shorter motor cables with lower charging current
F_PF	Motor Overload fault	Excessive motor load for too long	• Verify proper setting of P108 • Verify drive and motor are proper size for application
F_rF	Flying Restart fault	Controller was unable to synchronize with the motor during restart attempt; (P110 = 5 or 6)	Check motor / load
F_SF	Single-Phase fault	A mains phase has been lost	Check mains voltage
F_UF	Start fault	Start command was present when power was applied (P110 = 0 or 2).	• Must wait at least 2 seconds after power-up to apply Start command • Consider alternate starting method (P110).
F_FAU	TB5 (0-10V signal) Threshold fault	0-10V signal (at TB5) drops below the value set in P158.	• Check signal/signal wire • Refer to parameters P157 and P158

(1) The drive can only be restarted if the error message has been reset.

Appendix A

A.1 Permissable Cable Lengths

The table herein lists the permissable cable lengths for use with an SMV inverter with an internal EMC filter.

NOTE
This table is intended as a reference guideline only; application results may vary. The values in this table are based on testing with commonly available low-capacitance shielded cable and commonly available AC induction motors. Testing is conducted at worst case speeds and loads.

Maximum Permissible Cable Lengths (Meters) for SMV Model with Internal EMC Filters									
Mains	**Model**	**4 kHz Carrier (P166 = 0)**		**6 kHz Carrier (P166 = 1)**		**8 kHz Carrier (P166 = 2)**		**10 kHz Carrier (P166 = 3)**	
		Class A	Class B	Class A	Class B	Class A	Class B	Class A	Class B
240 V, 1-phase (2/PE)	ESV251ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
	ESV371ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
	ESV751ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
	ESV112ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
	ESV152ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
	ESV222ⅆⅆ2SFⅆ	38	12	35	10	33	5	30	N/A
400/480 V,3-phase (3/PE)	ESV371ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV751ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV112ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV152ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV222ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV302ⅆⅆ4TFⅆ	30	4	25	2	20	N/A	10	N/A
	ESV402ⅆⅆ4TFⅆ	54	5	48	3	42	2	N/A	N/A
	ESV552ⅆⅆ4TFⅆ	54	5	48	3	42	2	N/A	N/A
	ESV752ⅆⅆ4TFⅆ	54	5	48	3	42	2	N/A	N/A

NOTE: The "ⅆⅆ" and "ⅆ" symbols are place holders in the Model part number that contain different information depending on the specific configuration of the model. Refer to the SMV Type Number Designation table in section 2.2 for more information.

Lenze Americas Corporation
630 Douglas Street
Uxbridge, MA 01569
USA

800 217-9100
508 278-7873
marketing@lenzeamericas.com
www.Lenze.com

Service
Lenze AC Tech Corporation
630 Douglas Street
Uxbridge, MA 01569
USA

508 278-9100
508 278-6620
repair@lenzeamericas.com

Product data sheet
Characteristics

RE17RAMU
on-delay timing relay - 1 s..100 h - 24..240 V AC - 1 OC

Main

Range of product	Zelio Time
Product or component type	Modular timing relay
Discrete output type	Relay
Width	17.5 mm
Component name	RE17R
Time delay type	A At
Time delay range	0.1...1 s 1...10 h 1...10 min 1...10 s 10...100 h 6...60 min 6...60 s
Nominal output current	8 A

Complementary

Contacts material	Cadmium free
Control type	Selector switch on front panel
[Us] rated supply voltage	24 V DC 24...240 V AC at 50/60 Hz
Voltage range	0.85...1.1 Us
Supply frequency	50...60 Hz (+/- 5 %)
Release of input voltage	10 V
Connections - terminals	Screw terminals, clamping capacity: 2 x 0.2...2 x 1.5 mm² AWG 24...AWG 16 (flexible) with cable end Screw terminals, clamping capacity: 1 x 0.2...1 x 2.5 mm² AWG 24...AWG 14 (flexible) with cable end Screw terminals, clamping capacity: 2 x 0.5...2 x 2.5 mm² AWG 20...AWG 14 (solid) without cable end Screw terminals, clamping capacity: 1 x 0.5...1 x 3.3 mm² AWG 20...AWG 12 (solid) without cable end
Tightening torque	0.6...1 N.m conforming to IEC 60947-1
Housing material	Self-extinguishing
Repeat accuracy	+/- 0.5 % conforming to IEC 61812-1
Temperature drift	+/- 0.05 %/°C
Voltage drift	+/- 0.2 %/V
Setting accuracy of time delay	+/- 10 % of full scale at 25 °C conforming to IEC 61812-1
Control signal pulse width	30 ms typical 100 ms with load in parallel typical
Insulation resistance	100 MOhm at 500 V DC conforming to IEC 60664-1
Reset time	120 ms on de-energisation typical
On-load factor	100 %
Power consumption in VA	<= 32 VA at 240 V AC
Power consumption in W	<= 0.6 W at 24 V DC
Minimum switching current	10 mA 5 V DC
Maximum switching current	8 A AC/DC
Maximum switching voltage	250 V AC
Breaking capacity	<= 2000 VA

Operating frequency	10 Hz
Electrical durability	100000 cycles for resistive load (8 A at 250 V AC maximum)
Mechanical durability	10000000 cycles
Dielectric strength	2.5 kV 1 mA/1 minute 50 Hz conforming to IEC 61812-1
[Uimp] rated impulse withstand voltage	5 kV (1.2/50 µs)
Power on delay	< 100 ms
Marking	CE
Creepage distance	4 kV/3 conforming to IEC 60664-1
Mounting position	Any position in relation to normal vertical mounting plane
Mounting support	35 mm DIN rail conforming to EN/IEC 60715
Local signalling	LED indicator pulsing: relay de-energised, no timing in progress (except function Di-D, Li-L) (5 % ON and 95 % OFF) LED indicator flashing: timing in progress (80 % ON and 20 % OFF) LED indicator on steady: relay energised, no timing in progress
Product weight	0.07 kg

Environment

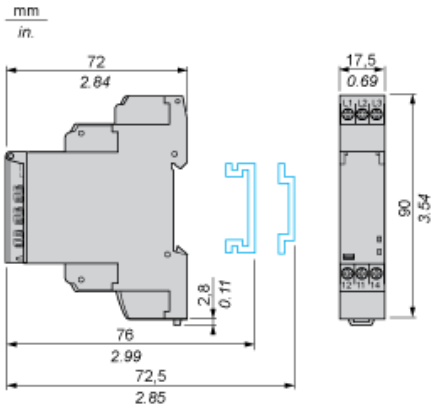
Immunity to microbreaks	<= 20 ms
Standards	2004/108/EC EN 61000-6-1 EN 61000-6-2 EN 61000-6-3 EN 61000-6-4 IEC 61812-1 2006/95/EC
Product certifications	CSA CULus GL
Ambient air temperature for storage	-30...60 °C
Ambient air temperature for operation	-20...60 °C
IP degree of protection	IP50 (front panel) conforming to IEC 60529 IP40 (housing) conforming to IEC 60529 IP20 (terminal block) conforming to IEC 60529
Vibration resistance	20 m/s² (f = 10...150 Hz) conforming to IEC 60068-2-6
Shock resistance	15 gn (duration = 11 ms) conforming to IEC 60068-2-27
Relative humidity	93 % without condensation conforming to IEC 60068-2-30
Electromagnetic compatibility	Conducted and radiated emissions conforming to EN 55022 class B Voltage dips and interruptions immunity test, 25/30 cycles at 70 % conforming to IEC 61000-4-11 Voltage dips and interruptions immunity test, 1 cycle at 0 % conforming to IEC 61000-4-11 Conducted RF disturbances, 0.15...80 MHz at 10 V conforming to IEC 61000-4-6 level 3 1.2/50 µs shock waves immunity test, common mode at 2 kV conforming to IEC 61000-4-5 level 3 1.2/50 µs shock waves immunity test, differential mode at 1 kV conforming to IEC 61000-4-5 level 3 Electrical fast transient/burst immunity test, direct at 2 kV conforming to IEC 61000-4-4 level 3 Electrical fast transient/burst immunity test, capacitive connecting clip at 1 kV conforming to IEC 61000-4-4 level 3 Susceptibility to electromagnetic fields, 80 MHz to 1 GHz at 10 V/m conforming to IEC 61000-4-3 level 3 Electrostatic discharge immunity test, in air at 8 kV conforming to IEC 61000-4-2 level 3 Electrostatic discharge immunity test, in contact at 6 kV conforming to IEC 61000-4-2 level 3

Offer Sustainability

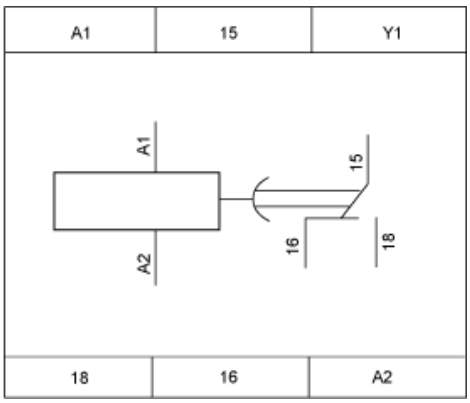
Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 1243 - Schneider Electric declaration of conformity
REACh	Reference not containing SVHC above the threshold
Product environmental profile	Available Download Product Environmental
Product end of life instructions	Available Download End Of Life Manual

RE17RAMU

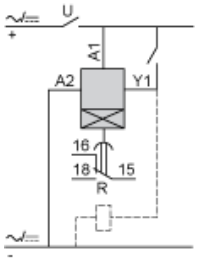
Width 17.5 mm



Internal Wiring Diagram



Wiring Diagram



Function A : Power on Delay Relay

Description

The timing period T begins on energisation. After timing, the output(s) R close(s). The second output can be either timed or instantaneous.

Function: 1 Output

Function: 2 Outputs

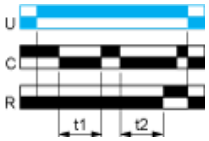
2 timed outputs (R1/R2) or 1 timed output (R1) and 1 instantaneous output (R2 inst.)

Function At : Power on Delay Relay (Summation) with Control Signal

Description

After power-up, the first opening of control contact C starts the timing. Timing can be interrupted each time control contact closes. When the cumulative total of time periods elapsed reaches the pre-set value T, the output relay closes.

Function: 1 Output



T = t1 + t2 +...

Legend

Relay de-energised

Relay energised

Output open

Output closed

C	Control contact
G	Gate
R	Relay or solid state output
R1/ R2	2 timed outputs
R2 inst.	The second output is instantaneous if the right position is selected
T	Timing period
Ta	Adjustable On-delay
-	
Tr	Adjustable Off-delay
-	
U	Supply

APPENDIX H

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
Williamsburg Bridgeview Apartments
Brooklyn, New York
NYSDEC Site Number C224233

Prepared For:

LPC Development Group LLC

Bronx, NY

Prepared By:

equity environmental engineering

500 International Drive
Suite 150
Mt. Olive, NJ 07828

August 2018

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SECTION 1

PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP) specifies analytical methods to be used to ensure that data from the proposed remedial action is precise, accurate, representative, comparable, and complete.

1.1 INTRODUCTION

This QAPP has been prepared by Equity Environmental Engineering, LLC (Equity) for the Williamsburg Bridgeview Apartments (WBA) to investigate soil and groundwater at the Site, located at 337 Berry Street, Brooklyn, New York, Site #C224233.

1.2 PROJECT OBJECTIVES

The objectives of this project are as follows:

1. Installation of soil borings, temporary groundwater monitoring wells, and soil-gas sampling points.
2. Collection of soil, groundwater, soil-gas, and indoor air samples to assist with the delineation of VOC contamination association with past Site operations.

1.3 SCOPE OF WORK

The scope of work includes the installation of monitoring well(s) and the collection of soil-gas, indoor air, and groundwater samples as part of the Site Management Plan (SMP) for the WBA site.

1.4 DATA QUALITY OBJECTIVES AND PROCESSES

The quality assurance and quality control (QA/QC) objectives for all measurement data include:

- ***Precision*** - an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and matrix spike duplicates.

- ***Accuracy*** - a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. Sampling accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and

the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

- ***Representativeness*** - expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be determined by assessing a number of investigation procedures, including chain of custody, decontamination, and analysis of field blanks and trip blanks.

- ***Completeness*** - the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.

- ***Comparability*** - expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis, instrument calibrations, using standard reporting units and reporting formats.

  Each of the above objectives is discussed in detail in Section 3.

SECTION 2

PROJECT ORGANIZATION

This Remedial Investigation will be completed for WBA Products, Inc. Equity Environmental Engineering, LLC (Equity) will coordinate the field activities and provide an on-site field representative to perform the site Health & Safety, soil, soil vapor, and groundwater sampling. Equity will perform the data analysis and all reporting tasks. The analytical services will be performed by an ELAP approved laboratory.

Key contacts for this project are as follows:

LPC Development Group LLC.	Mr. Peter Procida Telephone: (973) 242-6521 Fax: (973) 242-0131
Equity Environmental Engineering Project Manager:	Mr. Robert Jackson Telephone: (973) 527-7451 Fax: (973)858-0280
	Mr. Peter Jaran, P.E. Telephone: (973)-527-7451 Fax: (973)858-0280
SGS Accutest Laboratory Address: 2235 Rt. 130 Dayton, NJ 08810	Ms. Tammy McCloskey Telephone: (732) 329-2000 Fax: (732) 329-3499

SECTION 3

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) OBJECTIVES FOR MEASUREMENT OF DATA

3.1 INTRODUCTION

The quality assurance and quality control (QA/QC) objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in following subsections. They are formulated to meet the requirements of the USEPA SW-846. The analytical methods are given in Section 7.

3.2 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 - V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in the following tables.

					Control Limits (%)		Rev: 2/15/18	
Compound	CAS No.	RL	MDL	Units	MS/MSD	RPD	BS	DUP
Acetone	67-64-1	10	6	ug/l	34-149	17	42-150	20
Benzene	71-43-2	0.5	0.43	ug/l	54-136	10	80-120	20
Bromochlo	74-97-5	1	0.48	ug/l	79-124	11	84-121	20
Bromodich	75-27-4	1	0.58	ug/l	79-124	11	83-120	20
Bromoforn	75-25-2	1	0.63	ug/l	71-130	11	76-129	20
Bromomet	74-83-9	2	1.5	ug/l	53-142	14	57-138	20
2-Butanon	78-93-3	10	6.9	ug/l	54-142	15	64-137	20
Carbon dis	75-15-0	2	0.95	ug/l	59-145	17	64-137	20
Carbon tet	56-23-5	1	0.55	ug/l	70-143	12	75-135	20
Chloroben	108-90-7	1	0.56	ug/l	78-123	10	84-117	20
Chloroetha	75-00-3	1	0.73	ug/l	57-141	14	63-132	20
Chloroforn	67-66-3	1	0.5	ug/l	76-123	11	80-119	20
Chloromet	74-87-3	1	0.76	ug/l	43-141	16	46-136	20
Cyclohexar	110-82-7	5	0.78	ug/l	51-155	16	64-137	20
1,2-Dibron	96-12-8	2	1.2	ug/l	66-130	13	72-127	20
Dibromoch	124-48-1	1	0.56	ug/l	76-125	11	80-123	20
1,2-Dibron	106-93-4	1	0.48	ug/l	78-119	11	84-117	20
1,2-Dichlor	95-50-1	1	0.53	ug/l	77-123	11	84-119	20
1,3-Dichlor	541-73-1	1	0.54	ug/l	76-122	11	81-117	20
1,4-Dichlor	106-46-7	1	0.51	ug/l	76-122	11	82-117	20
Dichlorodif	75-71-8	2	1.4	ug/l	31-159	16	36-149	20
1,1-Dichlor	75-34-3	1	0.57	ug/l	73-126	11	79-120	20
1,2-Dichlor	107-06-2	1	0.6	ug/l	72-131	11	78-126	20
1,1-Dichlor	75-35-4	1	0.59	ug/l	63-136	14	69-126	20
cis-1,2-Dicl	156-59-2	1	0.51	ug/l	60-136	11	80-120	20
trans-1,2-D	156-60-5	1	0.54	ug/l	70-126	11	76-120	20
1,2-Dichlor	78-87-5	1	0.51	ug/l	78-124	10	82-121	20
cis-1,3-Dicl	10061-01-5	1	0.47	ug/l	79-123	11	83-120	20
trans-1,3-D	10061-02-6	1	0.43	ug/l	77-123	11	82-121	20
Ethylbenze	100-41-4	1	0.6	ug/l	51-140	20	80-120	20
Freon 113	76-13-1	5	1.9	ug/l	60-192	14	62-182	20
2-Hexanon	591-78-6	5	2	ug/l	56-139	14	65-132	20
Isopropylb	98-82-8	1	0.65	ug/l	75-129	11	83-120	20
Methyl Ac	79-20-9	5	0.8	ug/l	55-131	15	67-129	20
Methylcycl	108-87-2	5	0.6	ug/l	57-155	13	71-134	20
Methyl Ter	1634-04-4	1	0.51	ug/l	72-123	11	80-119	20
4-Methyl-2	108-10-1	5	1.9	ug/l	66-136	13	71-131	20
Methylene	75-09-2	2	1	ug/l	73-125	13	77-120	20
Styrene	100-42-5	1	0.7	ug/l	75-129	11	82-122	20
1,1,2,2-Tet	79-34-5	1	0.65	ug/l	71-122	11	76-119	20
Tetrachlor	127-18-4	1	0.9	ug/l	61-139	11	70-131	20
Toluene	108-88-3	1	0.53	ug/l	60-135	10	80-120	20
1,2,3-Trich	87-61-6	1	0.5	ug/l	70-138	13	76-134	20
1,2,4-Trich	120-82-1	1	0.5	ug/l	72-137	13	79-132	20
1,1,1-Trich	71-55-6	1	0.54	ug/l	74-138	12	81-128	20
1,1,2-Trich	79-00-5	1	0.53	ug/l	78-121	11	83-118	20
Trichloroet	79-01-6	1	0.53	ug/l	62-141	10	80-120	20

Trichlorofl	75-69-4	2	0.84	ug/l	57-149	14	64-136	20
Vinyl chlor	75-01-4	1	0.79	ug/l	43-146	15	51-135	20
m,p-Xylene		1	0.78	ug/l	50-144	20	80-120	20
o-Xylene	95-47-6	1	0.59	ug/l	63-134	10	80-120	20
Xylene (tot	1330-20-7	1	0.59	ug/l	56-139	20	80-120	20

Dibromofl	1868-53-7	Surrogate Limits:	80-120
1,2-Dichlor	17060-07-0	Surrogate Limits:	81-124
Toluene-D	2037-26-5	Surrogate Limits:	80-120
4-Bromofl	460-00-4	Surrogate Limits:	80-120

Table 3
SVOCs

Compounc	CAS No.	RL	MDL	Units	Control Limits (%) MS/MSD	RPD	Rev: 5/10/17 BS	DUP
2-Chloropl	95-57-8	5	0.82	ug/l	36-113	33	39-106	30
4-Chloro-3	59-50-7	5	0.89	ug/l	40-126	29	45-118	30
2,4-Dichlor	120-83-2	2	1.3	ug/l	40-119	30	43-115	30
2,4-Dimetl	105-67-9	5	2.4	ug/l	34-134	30	38-125	30
2,4-Dinitro	51-28-5	5	1.6	ug/l	22-157	34	35-137	30
4,6-Dinitro	534-52-1	5	1.3	ug/l	26-151	37	45-134	30
2-Methylp	95-48-7	2	0.89	ug/l	31-119	32	34-106	30
3&4-Meth		2	0.88	ug/l	29-118	31	31-110	30
2-Nitrophe	88-75-5	5	0.96	ug/l	38-123	34	41-118	30
4-Nitrophe	100-02-7	10	1.2	ug/l	10-161	36	10-113	30
Pentachlor	87-86-5	4	1.4	ug/l	22-149	36	21-134	30
Phenol	108-95-2	2	0.39	ug/l	10-110	35	10-110	30
2,3,4,6-Tet	58-90-2	5	1.5	ug/l	43-131	36	41-129	30
2,4,5-Trich	95-95-4	5	1.3	ug/l	45-118	30	45-117	30
2,4,6-Trich	88-06-2	5	0.92	ug/l	48-126	31	47-125	30
Acenaphth	83-32-9	1	0.19	ug/l	44-119	28	40-114	30
Acenaphth	208-96-8	1	0.14	ug/l	40-115	28	40-109	30
Acetophen	98-86-2	2	0.21	ug/l	34-127	32	43-112	30
Anthracen	120-12-7	1	0.21	ug/l	44-120	30	50-113	30
Atrazine	1912-24-9	2	0.45	ug/l	31-149	30	46-141	30
Benzaldeh	100-52-7	5	0.29	ug/l	11-132	37	27-116	30
Benzo(a)ar	56-55-3	1	0.2	ug/l	48-116	30	55-110	30
Benzo(a)py	50-32-8	1	0.21	ug/l	43-120	31	52-112	30
Benzo(b)flu	205-99-2	1	0.21	ug/l	42-123	31	53-114	30
Benzo(g,h,	191-24-2	1	0.34	ug/l	39-121	32	46-115	30
Benzo(k)flu	207-08-9	1	0.21	ug/l	44-123	31	55-115	30
4-Bromopl	101-55-3	2	0.4	ug/l	47-127	31	47-122	30
Butyl benz	85-68-7	2	0.46	ug/l	41-135	32	50-124	30
1,1'-Biphen	92-52-4	1	0.21	ug/l	39-124	29	42-114	30
2-Chlorona	91-58-7	2	0.24	ug/l	37-120	30	33-112	30
4-Chloroar	106-47-8	5	0.34	ug/l	10-110	49	17-87	30
Carbazole	86-74-8	1	0.23	ug/l	46-127	29	54-118	30
Caprolacta	105-60-2	2	0.65	ug/l	10-110	37	10-110	30
Chrysene	218-01-9	1	0.18	ug/l	45-113	30	52-107	30
bis(2-Chlor	111-91-1	2	0.28	ug/l	33-122	29	38-116	30
bis(2-Chlor	111-44-4	2	0.25	ug/l	29-132	36	38-118	30
2,2'-Oxybis	108-60-1	2	0.4	ug/l	27-115	34	29-108	30
4-Chloropl	7005-72-3	2	0.37	ug/l	43-125	30	40-122	30
2,4-Dinitro	121-14-2	1	0.55	ug/l	49-135	31	54-129	30

Table 3
SVOCs

2,6-Dinitro	606-20-2	1	0.48	ug/l	50-135	32	53-131	30
3,3'-Dichlo	91-94-1	2	0.51	ug/l	2-115	43	28-91	30
1,4-Dioxan	123-91-1	1	0.66	ug/l	10-110	42	10-110	30
Dibenzo(a,	53-70-3	1	0.33	ug/l	44-121	32	51-117	30
Dibenzofur	132-64-9	5	0.22	ug/l	43-123	29	46-118	30
Di-n-butyl	84-74-2	2	0.5	ug/l	46-133	30	54-124	30
Di-n-octyl	117-84-0	2	0.23	ug/l	31-147	32	41-137	30
Diethyl pht	84-66-2	2	0.26	ug/l	46-126	30	49-122	30
Dimethyl p	131-11-3	2	0.22	ug/l	49-120	29	51-118	30
bis(2-Ethyl	117-81-7	2	1.7	ug/l	35-140	35	47-128	30
Fluoranthe	206-44-0	1	0.17	ug/l	48-122	30	54-118	30
Fluorene	86-73-7	1	0.17	ug/l	45-121	30	45-116	30
Hexachlorc	118-74-1	1	0.33	ug/l	42-129	32	45-124	30
Hexachlorc	87-68-3	1	0.49	ug/l	10-129	36	10-120	30
Hexachlorc	77-47-4	10	2.8	ug/l	10-111	40	10-110	30
Hexachlorc	67-72-1	2	0.39	ug/l	12-116	37	11-110	30
Indeno(1,2	193-39-5	1	0.33	ug/l	39-129	33	45-123	30
Isophoron	78-59-1	2	0.28	ug/l	37-122	29	43-115	30
2-Methyln	91-57-6	1	0.21	ug/l	33-118	31	37-111	30
2-Nitroanil	88-74-4	5	0.28	ug/l	32-156	31	40-144	30
3-Nitroanil	99-09-2	5	0.39	ug/l	11-114	41	31-104	30
4-Nitroanil	100-01-6	5	0.44	ug/l	31-125	30	48-119	30
Naphthale	91-20-3	1	0.23	ug/l	24-119	33	29-110	30
Nitrobenze	98-95-3	2	0.64	ug/l	28-130	32	35-118	30
N-Nitroso-	621-64-7	2	0.48	ug/l	29-128	31	38-116	30
N-Nitrosod	86-30-6	5	0.22	ug/l	40-128	31	49-114	30
Phenanthr	85-01-8	1	0.18	ug/l	41-128	30	49-116	30
Pyrene	129-00-0	1	0.22	ug/l	47-122	30	51-116	30
1,2,4,5-Tet	95-94-3	2	0.37	ug/l	23-134	31	21-124	30

2-Fluoroph	367-12-4	Surrogate Limits:	10-110
Phenol-d5	4165-62-2	Surrogate Limits:	10-110
2-Chloroph		Surrogate Limits:	70-130
2,4,6-Tribr	118-79-6	Surrogate Limits:	36-151
1,2-Dichlor	2199-69-1	Surrogate Limits:	70-130
Nitrobenze	4165-60-0	Surrogate Limits:	34-128
2-Fluorobi	321-60-8	Surrogate Limits:	38-119
Terphenyl-	1718-51-0	Surrogate Limits:	26-129

					Control Limits (%)		Rev: 3/30/17	
Compounc	CAS No.	RL	MDL	Units	MS/MSD	RPD	BS	DUP
Aldrin	309-00-2	0.005	0.0026	ug/l	10-157	46	13-135	25
alpha-BHC	319-84-6	0.005	0.0026	ug/l	33-154	45	36-139	25
beta-BHC	319-85-7	0.005	0.004	ug/l	36-154	45	44-136	25
delta-BHC	319-86-8	0.005	0.0033	ug/l	29-165	50	40-139	25
gamma-BH	58-89-9	0.005	0.003	ug/l	33-154	43	43-136	25
alpha-Chlo	5103-71-9	0.005	0.0025	ug/l	26-158	44	32-140	25
gamma-Ch	5103-74-2	0.005	0.0021	ug/l	20-163	44	28-143	25
Dieldrin	60-57-1	0.005	0.0038	ug/l	24-165	44	39-142	25
4,4'-DDD	72-54-8	0.005	0.0029	ug/l	27-157	45	36-142	25
4,4'-DDE	72-55-9	0.005	0.0025	ug/l	13-164	43	27-140	25
4,4'-DDT	50-29-3	0.005	0.0034	ug/l	11-169	44	30-144	25
Endrin	72-20-8	0.005	0.003	ug/l	39-170	42	44-151	25
Endosulfar	1031-07-8	0.005	0.0027	ug/l	22-164	49	41-144	25
Endrin alde	7421-93-4	0.005	0.0034	ug/l	21-176	48	42-144	25
Endrin ket	53494-70-5	0.005	0.0031	ug/l	33-166	45	41-149	25
Endosulfar	959-98-8	0.005	0.0026	ug/l	23-161	44	40-136	25
Endosulfar	33213-65-9	0.005	0.0024	ug/l	30-161	43	42-140	25
Heptachlor	76-44-8	0.005	0.0022	ug/l	10-158	47	11-140	25
Heptachlor	1024-57-3	0.005	0.003	ug/l	29-163	43	41-138	25
Methoxycl	72-43-5	0.01	0.0034	ug/l	15-164	46	31-149	25
Toxaphene	8001-35-2	0.13	0.08	ug/l	50-150	30	40-140	25
Tetrachlor	877-09-8				Surrogate Limits:		13-153	
Decachlor	2051-24-3				Surrogate Limits:		10-138	

Table 3
PCBs

Compounc	CAS No.	RL	MDL	Units	Control Limits (%) MS/MSD	RPD	Rev: 2/2/17 BS	DUP
Aroclor 10	12674-11-2	0.25	0.098	ug/l	18-187	42	37-164	30
Aroclor 12	11104-28-2	0.25	0.21	ug/l	70-130	50	70-130	30
Aroclor 12	11141-16-5	0.25	0.13	ug/l	70-130	50	70-130	30
Aroclor 12	53469-21-9	0.25	0.11	ug/l	70-130	50	70-130	30
Aroclor 12	12672-29-6	0.25	0.063	ug/l	70-130	50	70-130	30
Aroclor 12	11097-69-1	0.25	0.21	ug/l	70-130	50	70-130	30
Aroclor 12	11096-82-5	0.25	0.076	ug/l	10-185	46	36-155	30
Aroclor 12	11100-14-4	0.25	0.087	ug/l		50		30
Aroclor 12	37324-23-5	0.25	0.097	ug/l		50		30
Tetrachlor	877-09-8				Surrogate Limits:		11-166	
Decachlor	2051-24-3				Surrogate Limits:		10-150	

9 compounds and 2 surrogates reported in list PCB11

Table 3
Metals

TEST	Method 200.7/6010 waters - normal RL in ug/l - ICP	Method 200.7/6010 waters - NJ RL in ug/l - ICP	Method 6010 waters - pooled MDL for SS ICP's in ug/l
Al	200.0		45.84
Sb	6.0		4.67
As	8.0	3.000	2.76
Ba	200.0		13.37
Be	1.0		0.50
Cd	3.0		1.04
Ca	5000.0		99.20
Cr	10.0		1.99
Co	50.0		2.57
Cu	10.0		5.85
Fe	100.0		32.11
Pb	3.0		1.80
Mg	5000.0		139.77
Mn	15.0		1.44
Ni	10.0		1.71
K	10000.0		200.30
Se	10.0		4.94
Ag	10.0		1.88
Na	10000.0		568.60
Tl	10.0		1.76
V	50.0		1.79
Zn	20.0		6.90

TEST	RL	MDL
Hg AQ and TCLP Hg, SW846 7470A	0.2 ug/l	0.0952

3.3 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R	=	Percent recovery.
SSR	=	Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.
SR	=	Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.
SA	=	Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Tables 3.1 through 3.4.

3.4 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Health and Safety Plan, and according to the NJDEP Field Sampling Procedures Manual (2005). Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate and Chain-of-custody procedures are presented in Sections 4 and 5.

3.5 COMPLETENESS

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

3.6 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

SECTION 4

SAMPLING PROGRAM

4.1 INTRODUCTION

The sampling program will provide data concerning the presence and the nature and extent of soil, groundwater, soil-gas, and indoor air contamination. This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be taken are given in Table 4.1. The sampling procedures are presented in the Remedial Investigation Workplan.

4.2 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION

Sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the NJDEP. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged and the appropriate preservatives will be added. The types of containers are listed in Tables 4.2 and 4.3.

Samples shall be preserved according to the preservation techniques given in Tables 4.2 and 4.3. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4^{o}C with ice, and delivered to the laboratory within 24 hours of collection. Chain-of-custody procedures are described in Section 7.

Soil-gas and indoor air samples will be shipped to the laboratory at ambient temperatures with no preservative.

4.3 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.2 and 4.3 and must be in accordance with the NYSDEC requirements. The holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to WBA.

4.4 FIELD QC SAMPLES

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates. Matrix

spike/matrix spike duplicates (MS/MSDs) will be completed by Accutest Laboratories and in accordance with Accutest's Quality System precision, accuracy, and completeness objectives. The blanks will include:

a. Trip Blanks - A Trip Blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples VOC analysis. The Trip Blank will be analyzed for VOCs to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field Blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix, or one per day. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will consist of:

a. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

b. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be completed by the analytical laboratory and/or taken at a frequency of one pair per 20 field samples and/or in accordance with Accutest's Quality System objectives.. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Section 3 tables.

TABLE 4.1
SUMMARY OF SAMPLES AND ANALYSES

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks		Total
			Field Samples	Field Duplicate	MS/MSD[a] (Total)	Sub-Total	Trip Blank	Rinse Blank	
Groundwater Samples	TCL VOCs, SVOCs, Pesticides, PCBs, and TAL Metals	EPA SW846 8260, 8270, 8081, 8082 EPA 200.7/SW84	3	1	1	5	1	1	7
Indoor air	VOCs	TO+15	3	1		4			4

(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis; to be completed by Accutest Laboratories.

(b) The total number of soil samples will be determined in the field based on the scheduling and duration of the events.

(c) The total number of groundwater samples will be determined in the field (if necessary).

TABLE 4.2
WATER SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	3-40 mL glass vial w/ Teflon septum	Cool to 4°C	24 hrs-field/14 days
SVOCs 8270 1,4-Dioxane	2 x 1L unpreserved	Cool to 4°C	7 days for extraction
Pesticides 8081 PCBs 8082	2 x 1L unpreserved	Cool to 4°C	7 days for extraction
TAL Metals	1-500 mL poly w/ Teflon septum	HNO3, Cool to 4oC	48 hrs-field/ 6 Months
PFAs	2x250 ml HPDE	Cool to 4°C	14 days for extraction

(a) All samples to be preserved in ice during collection and transport.

(b) Days from time of sample receipt at the laboratory. Maximum field holding time for all samples is 48-hours.

TABLE 4.3
AIR SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation	Holding Time (a)
TO+15	Stainless Steel Summa Canister	None	

(a) Days from time of sample receipt at the laboratory. Maximum field holding time for all samples is 48-hours.

SECTION 5

SAMPLE TRACKING AND CUSTODY

5.1 INTRODUCTION

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the Chain-of-custody (COC) and transfer of samples will be trained as to the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 5.1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.2 FIELD SAMPLE CUSTODY

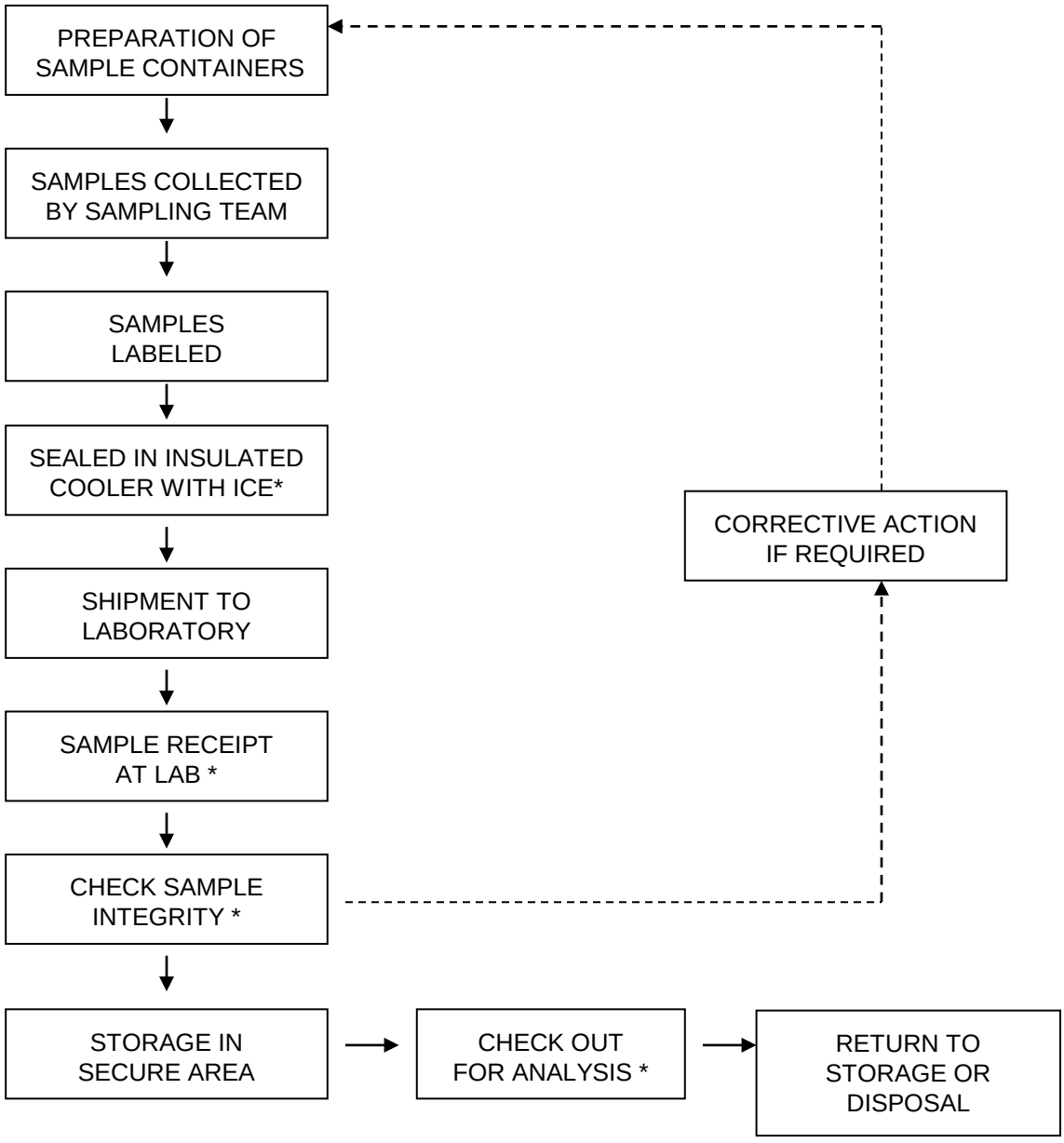
A COC record (Figure 5.2 or similar) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment and the shipper air bill number of the top of the COC, if applicable. Mistakes will be crossed out with a single line in ink and initialed.

FIGURE 5.1

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

CHAIN OF CUSTODY

PAGE ___ OF ___

FED-EX Tracking #	Bottle Order Control #
SGS Quote #	SGS Job #

Client / Reporting Information

Company Name

Street Address

City State Zip

Project Contact E-mail

Phone # Fax #

Sampler(s) Name(s) Phone #

Project Information

Project Name:

Street

City State

Project #

Client Purchase Order #

Project Manager

Billing Information (if different from Report to)

Company Name

Street Address

City State Zip

Attention:

Requested Analysis (see TEST CODE sheet)

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

Lab Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	LAB USE ONLY

Turnaround Time (Business days)

- ☐ Std. 10 Business Days
- ☐ 5 Day RUSH
- ☐ 3 Day RUSH
- ☐ 2 Day RUSH
- ☐ 1 Day RUSH
- ☐ other _____

Emergency & Rush T/A data available via LabLink

Approved by (SGS Project Manager)/Date:

Data Deliverable Information

- ☐ Commercial "A" (Level 1)
- ☐ Commercial "B" (Level 2)
- ☐ FULLT1 (Level 3+4)
- ☐ NJ Reduced
- ☐ Commercial "C"
- ☐ NJ Data of Known Quality Protocol Reporting
- ☐ NYASP Category A
- ☐ NYASP Category B
- ☐ State Forms
- ☐ EDD Format _____
- ☐ Other _____

Commercial "A" = Results Only; Commercial "B" = Results + QC Summary

NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		1	2		2
Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
3		3	4		4
Relinquished by:	Date Time:	Received By:	Custody Seal # ☐ Intact ☐ Not intact	Preserved where applicable ☐	On Ice ☐ Cooler Temp.
5		5			

One copy of the COC is retained by sampling personnel (notations identifying blind duplicate samples will be added to this copy of the COC but not the others that will go to the laboratory) and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will only be analyzed pending further investigation.

5.3 LABORATORY SAMPLE CUSTODY

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

SECTION 6

CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the Field Sampling Plan. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all the instrument manuals will be maintained on-site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector; dataRam dust monitors) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in the sections of the USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods given in Section 7.

SECTION 7

ANALYTICAL PROCEDURES

Samples will be analyzed according to the USEPA SW-846 "Test Methods for Evaluating Solid Waste," February 2007, revision 6 and subsequent updates. The methods to be used for the laboratory analysis of soil, groundwater, and soil-gas/indoor air samples are referenced in Section 3 (Tables 3.1 through 3.4).

SECTION 8

DATA REDUCTION, VALIDATION, AND REPORTING

8.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the Chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

8.2 DATA REDUCTION

One copy of the analytical data packages and an electronic disk deliverable (EDD) will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the CD-ROM, may be used to generate summary tables. These tables will form the database for assessment of the site contamination condition (if present).

The electronic deliverable format required is a tab delimited text file with the fields and character lengths summarized in Table 8.1. EDDs will be processed regardless of the sampling date.

The Project Manager or Task Manager will maintain close contact with the laboratory QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

Table 8.1

Field and Character Lengths
for Electronic Disk Deliverable

Description	Length	Format
Site ID	12	Character
Site Name	40	Character
Initial Date Sampled	8	Date
Received at Lab Date	8	Date
Analysis Complete Date	8	Date
Laboratory	30	Character
Number of Samples	3	Integer
Contract	6	Character
Report Format	10	Character
Field ID (for each sample)	15	Numeric
Laboratory ID (for each sample)	15	Character
Date Sampled (for each sample)	8	Date
Matrix (for each sample)	10	Character

8.3 DATA VALIDATION

Laboratory data validation may be performed in accordance with the USEPA Region II validation guidelines for organic and inorganic data review. These validation guidelines are regional modifications to the National Functional Guidelines for organic and inorganic data review (USEPA 1994). Validation will include the following:

- Verification of 100% of all QC sample results (both qualitative and quantitative),
- Verification of the identification of 100% of all sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Data Validation/Usability Report
- A third party data validator will not be used on this project.

The determination to validate data will be made based on the presence of data anomalies, suspect data, or laboratory issues. A data validation report will be prepared and reviewed by the laboratory quality assurance officer (QAO) before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Compound quantization and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;

- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected at given value;
- "UJ" - Estimated not detected at given value;
- "J" - Estimated value;
- “N” – Presumptive evidence at the value given;
- "R" - Result not useable; and
- No Flag - Result accepted without qualification.

SECTION 9

INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). MS/MSD samples will be designated by the laboratory and are not proposed to be collected in the field as part of this RIWP.

9.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

9.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

9.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

SECTION 10

QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

10.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the project Quality Assurance Officer (QAO). These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests additional audits may occur.

10.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation (PE) samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

10.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved

management. Non-compliance occasions will be logged, and documented through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

SECTION 11

PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

SECTION 12

CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NJDEP.

Project management and staff such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 12.1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

SECTION 13

REFERENCES

NYSDEC 2010. DER-10, *"Technical Guidance for Site Investigation and Remediation" revised 2017. New York State Department of Environmental Conservation.*

NYSDOH 2006. *Guiidance for Evaluating Soil Vapor Intrusion in the State of New York*. New York State Department of Health.

USEPA, 2002. "Guidance *for Quality Assurance Project Plans*," dated December 2002. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 2007. SW-846 *"Test Method for Evaluating Solid Waste,"* dated February 2007. U.S. Environmental Protection Agency, Washington, D.C.

Taylor, J. K., 1987. *"Quality Assurance of Chemical Measurements."* Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1987. *"Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7."* U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1992a. *"CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8,"* dated January 1992. USEPA Region II.

USEPA, 1992b. *"Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI,"* dated January 1992. USEPA Region II.

APPENDIX I

SITE MANAGEMENT FORM

Type	Inspection Task	Status	Condition	Date Completed	Initials	Remarks
Infrastructure	Building					
	Basement Slab					
	Pavement					
	Landscaping					
	New Structures					
	Monitoring Wells					
	SSDS					
	SVE					
Physical	Site Fences/Security					
	Topography					
	Surface Drainage					
	Cover System					
	Vegetation					
Contamination	Odors					
	Staining					
	Sheens					
Property Owner Representative	Interview					
	New					
Inspection Acknowledgement	Signature/Date_____ Representing_____					

Notes
Status - Modified/Unchanged
Condition - unchanged/Deteriorated
Interview - work completed during the previous year and future plans

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application. _____ **Date** **Contractor**

APPENDIX J

FIELD SAMPLING PLAN

Field Sampling Plan

Williamsburg Bridgeview Apartments

95-105 South 5th Street

Brooklyn, NY

NYSDEC Site Number: C224233

Prepared for:

LPC Development Group, LLC
456 E173rd St.
Bronx, NY 10457

Prepared by:
Equity Environmental Engineering LLC
500 International Drive
Mt. Olive, NJ 07828

August 2018

Table of Contents

List of Figures

1.0 Introduction

This Field Sampling Plan (FSP) presents the methods and procedures to be used for any ground intrusive, maintenance, and monitoring activities covered under the Williamsburg Bridgeview Apartment Site Management Plan.

1.1 Project Description

The site is located in Brooklyn, Kings County, New York and is identified as Block 2443 and Lot 6 (formerly lots 6, 37, and 41) on the Williamsburg Tax Map. The site is an approximately one-third-acre area and is bounded by Berry Street to the north, residential property to the east, commercial property to the west, and South 5th Street to the south (see Figures 1 and 2).

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential mixed use properties. The properties immediately south of the entire Site include South 5th Street and the Williamsburg Bridge underpass; the properties immediately north of the Site include residential properties; the properties immediately east of the Site include commercial and residential properties; and the properties to the west of the Site include residential properties.

The Site has been redeveloped and what once was a vacant warehouse and undeveloped land there is now an 11 story residential building and ancillary parking.

1.1 Scope of Work

The scope of work at the Site covered under this FSP includes.

- Monitoring well installation and development
- Groundwater sampling and analysis
- Indoor air and ambient air sampling and analysis
- Investigation-derived waste management
- Data validation, evaluation, and reporting
- Community air monitoring (addressed in a separate appendix)

This FSP will be modified for specialized work if necessary. Any modification to the FSAP will require approval in writing from the DEC. The property owner or its representative must notify National Grid of any scheduled ground intrusive work at least 15 days prior to the start of field activity.

2.0 General Field Guidelines

2.1 Site Hazards

Potential Site surface hazards, such as sharp objects, overhead power lines, energized areas, vehicular traffic, and building hazards will be identified prior to initiation of the fieldwork. Generally, potential hazards at the project site will be identified during a project site reconnaissance by the project team on the first day of any field activity. Additional safety measures to be undertaken for the work performed during the investigation are addressed in the Health and Safety Plan [(HASP), Appendix L of the SMP].

2.1 Underground Utilities

Underground utilities, including electric lines, gas lines, water lines, storm and sanitary sewers, and communication lines will be identified prior to initiation of any subsurface work. Underground utility location will be accomplished as follows:

- All work areas will be flagged or marked out with white paint.
- Dig Safely of New York (800) 272-4480 will be contacted to initiate the locating activities. New York State law requires that Dig Safely of New York be notified at least three working days, and not more than 10 working days, before subsurface work is conducted.
- Companies with subsurface utilities present will locate and mark out all subsurface utility lines.
- Geophysical methods may be used to further evaluate the potential presence of underground utilities in the area of each proposed investigation location.
- Subsurface investigation locations may be hand cleared to five feet below ground surface (bgs) prior to advancing borings with mechanized equipment.

2.2 Field Log Books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is developed. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Site Manager while fieldwork is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the field person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialling the correction.

- Corrections necessary after departing the field will be made by the person who entered the original information. Corrections will be made by drawing a line through the error, entering the correct information, and initialling and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members on site and site contacts;
- Names, titles of any site visitors, as well as the date and time entering and leaving the site;
- Weather information, for example: temperature, cloud coverage, wind speed, and direction;
- Purpose of field activity;
- A detailed description of the fieldwork conducted;
- Sample media (soil, sediment, groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- All field measurements made, such as volatile organic compounds (VOCs) using a PID, pH, temperature, conductivity, water level, etc.;
- References for all maps and photographs of the sampling site(s); and
- Information pertaining to sample documentation such as:
  - Bottle lot numbers;
  - Dates and method of sample shipments;
  - Chain-of-custody (COC) record numbers; and
  - Federal Express air bill number.

3.0 Field Equipment Decontamination and Management of Investigation-Derived Residuals

3.1 Decontamination Area

A temporary decontamination area lined with polyethylene sheeting will be constructed on the project site for use during decontamination of the drilling equipment. Water collected from the decontamination of activities will be collected in 55-gallon drums or a bulk tank and managed as described in Section 3.3.

3.2 Equipment Decontamination

The following procedures will be used to decontaminate equipment used during any activities.

- All drilling equipment including the augers, bits, rods, tools, and tremie pipes will be cleaned with a high-pressure, hot water pressure washing unit between locations and following completion of activities.
- Tools, drill rods, and augers will be placed on something other than the ground following pressure washing.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the project site.

3.2.1 Sampling Equipment Decontamination

Suggested Materials:

- Potable water;
- Phosphate-free detergent (such as Alconox™);
- Distilled water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes; and
- Personal protective equipment (PPE) in accordance with the HASP.

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be washed with potable water and a phosphate-free detergent (such as Alconox™). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a de-ionized water rinse.

- Between rinses, equipment will be placed on polyethylene sheets, if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic for storage or transportation from the designated decontamination area to the sampling location.

3.3 Management of Investigation-Derived Residuals

3.3.1 Decontamination Fluids

Hot water pressure wash and decontamination fluids will be collected in 55-gallon drums or a bulk tank. The storage drums or tank will be labelled as "pending analysis – investigation-derived residual decon water" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill Cuttings

Drill cuttings will be contained in 55-gallon drums. The drums will be labelled as "pending analysis – investigation-derived residual – soil from drill cuttings" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.3 Development and Purge Water

All development and purge water will be contained in 55-gallon drums or a bulk tank. The drums or tank will be labelled as "pending analysis - investigation derived residual development and purge water" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.4 Personal Protective Equipment

All PPE will be placed in thick mil plastic bags for proper disposal.

3.3.5 Dedicated Sampling Equipment

All dedicated groundwater sampling equipment will be placed in thick mil plastic bags or 55-gallon drums for disposal.

4.0 Soil Sampling and Well Installation Procedures

4.1 Introduction

Surface and subsurface activities to be conducted at the Site may consist of utility work; excavation; the installation of groundwater monitoring wells and soil vapor intrusion and indoor air sampling. These activities will require the use of the following equipment and material:

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Tape measure;
- Decontamination supplies;
- Water level indicator;
- Electronic oil/water interface probe
- Clear Teflon disposable bailers;
- Submersible electric pump for well development;
- Horiba multi-meter for field parameters (well development);
- PID with a 10.2 or 10.6 eV lamp;
- Camera;
- Clear tape, duct tape;
- Laboratory sample bottles;
- Coolers and ice; and

Procedures for these activities are described in the following sections.

4.2 Excavation

Excavation activities, if any, will be dictated by the Contractor hired to conduct the work and will follow the Excavation Work Plan included as Appendix E of the SMP. During field activities, personnel will stand upwind of the excavation area to the extent possible. Air monitoring and odor mitigation (if necessary) will be conducted in accordance with the Community Air Monitoring Project (CAMP) and HASP. Excavation materials will be photographed and logged for future reference. Material removed from the excavation will be placed on polyethylene sheeting. The location and size of the excavation will be measured and described in the field logbook.

Visually clean soils, such as surface soils, will be segregated from soils that may be impacted. The visually clean soils may be placed back in the excavation. At a minimum, the top 2 feet of backfilled soil will be visually clean. The excavation will be backfilled as soon as possible after completion and in general prior to the cessation of activities at the end of the day. If excavation resulted in removal of any remaining contamination, a demarcation layer as detailed in Appendix E of the SMP will be placed over the surface prior to backfilling. Following restoration of the excavation, the excavation will be staked/marked to facilitate subsequent location by surveying crews.

4.2.1 Soil Borings

Soil borings, if any, will be advanced with the appropriate drilling equipment for the work. Typically a direct-push (Geoprobe™) drilling rig equipped with 4-foot long, 2-inch diameter Macro-Core™ samplers will be used. A sonic drill rig may be used based on the depth of the boring based on previous onsite work. All drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.

All locations will be properly abandoned following the collection of samples. Boreholes for the direct-push borings will be filled with the soil cuttings and topped off with bentonite chips if necessary. The borings will be filled using a cement/bentonite grout mixture with the following specifications:

- Bentonite will be powdered sodium montmorillonite furnished in moisture resistant sacks without additives.
- Cement shall be a low-alkaline Portland cement, Type I in conformance with ASTM C-150 and without additives.
- The cement/bentonite grout mixture shall be to the following proportion:
  - Three sacks (94 pounds) of Type I Portland cement;
  - 14 pounds of granular bentonite (5% mix); and
  - 25 gallons of water.

The cement will be mechanically mixed, above ground, with water from a potable water source. Bentonite will be added to ensure a lump-free consistency. The mixture will be pumped through a tremie pipe as the drill is being withdrawn.

4.2.2 Geologic Logging Methods

The field technician will log borehole geology and headspace measurements, and any other observations (e.g., odors, non-aqueous phase liquid (NAPL), soil staining, etc.), in the field book and the soil boring log. Soil samples retrieved from the borehole will be visually described for: 1) percent recovery, 2) soil type, 3) color, 4) moisture content, 5) texture, 6) grain size and shape, 7) consistency, 8) visible evidence of staining or other hydrocarbon-related impacts, and 9) any other relevant observations. The descriptions will be in accordance with the Unified Soil Classification System (USCS) and the American Society for Testing and Materials (ASTM) guidelines.

4.2.3 Collection of Samples

The number and frequency of samples to be collected from each boring and the associated analytical parameters will be based on the field activity. The sample locations, descriptions, and depths will be recorded on the bore logs in the field book.

Samples for laboratory analyses will be collected directly from the sampling device and placed into appropriate containers for all grab sample analyses or homogenized for composite samples (except for VOC analyses); and compacted to minimize headspace and pore space. Dedicated sampling equipment will be used for soil sampling. Soil remaining after completion of sample description, collection, and field screening will be properly disposed.

The sample containers will be labelled, placed in a laboratory-supplied cooler, and packed with ice. The coolers will then be shipped to the laboratory for analysis. COC procedures will be followed as outlined in Appendix H Quality Assurance Project Plan (QAPP) of the SMP. If there is a delay of sample shipment due to insufficient samples to warrant overnight delivery, the samples will be stored in a cool, secure place with sufficient ice to maintain a temperature of 4° C.

4.3 Monitoring Well Installation and Development

The following methods will be used for drilling, installing, and developing the monitoring wells. Figure 3 and 4 illustrates the construction details for a typical overburden soil boring and monitoring well respectively. Specific details regarding the depth and anticipated screened interval of proposed monitoring wells is provided in the SMP. In general, monitoring wells will be installed according to the following specifications:

- The monitoring well borings will be advanced using a sonic drill rig
- Wells will be constructed with 2-inch ID, threaded, flush-joint, Schedule 40 PVC casings and screens.
- Screens will be 10-feet long with 0.01-inch slot openings (or 0.02-inch, if NAPL present) with a 2-foot DNAPL sump at the base. Alternative screen lengths up to 20 feet long may be used at the discretion of the field geologist and with the approval of DEC, based on site conditions.
- The annulus around the screens will be backfilled with clean silica sand having appropriate size (e.g., Morie No. 1) to a minimum height of 2 feet above the top of the screen.

- A bentonite chip seal with a minimum thickness of 2 feet will be placed above the sand pack. The bentonite seal will be hydrated with clean, potable water before placement of grout above the seal layer.
- The remainder of the annular space will be filled with cement-bentonite grout to ground surface. The grout will be allowed to set for a minimum of 24 hours before wells are developed.
- Each monitoring well will be a flush-mounted installation with a locking cap.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- The top of the PVC well casing and ground surface will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on the Construction Log shown in Appendix F of the SMP.
- If commercially available nested wells are considered to sample multiple aquifer depth zones in the same borehole, they will be discussed with DEC prior to installation.

4.3.2 Monitoring Well Development

- After a minimum of 24 hours after installation, the monitoring wells will be developed by surging and pumping. Surging will be performed periodically, across the lengths of screen in 2-foot increments prior to, at interim periods of pumping, and immediately before the final pumping. Pumping methods may include using a centrifugal, submersible, or peristaltic pump and dedicated polyethylene tubing.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- The wells will be developed until the water in the well is reasonably free of visible sediment (50 NTU if possible or until pH, temperature, and specific conductivity stabilize). A multi-meter probe will be used for all field parameter measurements.
- Development water will be contained in and properly disposed of.

Following development, wells will be allowed to recover for at least 14 days before groundwater is purged and sampled. All monitoring well development will be performed or overseen by a field geologist and recorded in the field book.

5.0 Groundwater Sampling Procedures

5.1 Introduction

Procedures for collecting groundwater samples of groundwater are described in this section. Groundwater samples will be collected using low-flow, low-stress purge and sampling methods.

5.2 Groundwater Sampling

The following method will be used to collect groundwater samples from monitoring wells.

5.2.1 Required Equipment and Supplies

- Field book
- Project plans
- PPE in accordance with the HASP
- Electronic oil/water interface probe
- Disposable Teflon bailers and low-flow sampling pump
- Polypropylene rope
- Multi-meter for all filed parameters
- Flow-through cell
- Decontamination supplies
- Peristaltic or submersible pump capable of achieving low-flow rates (i.e., 0.5 liters per minute or less)
- Plastic tubing
- Plastic sheeting
- PID
- Clear tape, duct tape
- Coolers and ice
- Laboratory sample bottles

5.2.2 Groundwater Sampling Method

5.2.2.1 Purging

- Prior to sampling, the static water level and thickness of any light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book.
- The probe will be decontaminated between uses.
- Groundwater from the well will be purged until field parameters stabilize, up to three well volumes are removed, or 1 hour of continuous purging is performed. Field parameters are considered to be stable when three consecutive readings are within the stabilization criteria for that parameter. The stabilization criteria are as follows: 10% or below 10 NTUs for turbidity, 3% for conductivity and temperature, 0.1 unit for pH, and 10 mV for ORP. Purging will be conducted using the low-flow sampling technique specified by the United States

Environmental Protection Agency (USEPA) Region 1 in its guidance document entitled "Low-Stress (low flow) Purging and Sampling for the Collection of Groundwater Samples from Monitoring Wells".

- The flow rate measurement will be approximately 0.5 liter per minute or less.
- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required parameters are met, and sampled when it recovers sufficiently, in accordance with low-flow sampling protocol.
- Purge water will be managed and disposed of properly.
- Peristaltic pumps will not be used to collect VOC samples.

5.2.2.2 Sampling

- Samples will be collected using dedicated 1/4- or 3/8-inch Teflon bailers.
- Prior to filling the sample bottles, the temperature, pH, conductivity, dissolved oxygen, and oxidation reduction potential (ORP), and turbidity will be measured within a flow-through cell. All measurements will be recorded in the field book.
- The sample container and preservative requirements are provided in the QAPP in Appendix H of the SMP.
- The sample containers will be labelled, placed in a laboratory-supplied cooler, and packed on ice (to maintain a temperature of 4ºC). The cooler will be shipped overnight or delivered to the laboratory for analysis.
- COC procedures will be followed as outlined in the QAPP (Appendix H of the SMP).
- Well sampling data will be recorded on the Groundwater Sampling Record shown in Figure 5 or similar form.

6.0 Indoor Air Sampling

An indoor air evaluation will be performed at the Site to establish post remedy conditions. The work will be performed in accordance with *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* [DOH, 2006] and the USEPA document entitled *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, Office of Solid Waste and Emergency Response* [USEPA, 2002].

A pre-sampling survey and a product inventory will be conducted on the day of sampling (Figure 6). The surveys and inventories will be completed in accordance with the NYDOH guidance. The chemical inventory check will be performed at each location to document current conditions with the regard to the storage of chemicals. The previous surveys will be reviewed and any changes in conditions from the previous sampling will be noted. As with previous surveys, a screening for total volatiles will be conducted with a PID. An ambient air sample will be collected concurrently with the indoor air samples for each property.

The methods to be used for the collection of the indoor air samples and the ambient air sample are summarized as follows:

- The indoor air sample will be collected from a minimum of two-feet above the floor surface.
- The ambient air sample will be collected at a location determined to be upwind at time of sampling.
- The indoor air and ambient air samples will be collected as an integrated sample. A laboratory-provided flow controller fixed to a negative pressure vessel (a batch certified clean 6-liter Summa canister) will be used to collect the integrated sample. The controller will be a fixed-rate flow controller and the approximate length of the sample time will be set by the laboratory. The flow controllers are fitted with an internal filter to prevent particulates from entering the Summa canisters.
- The sample time for the canisters will be set from 8-24 hours depending on the use of the data. The collection of the samples in 6-liter canisters over an approximate time interval will ensure that the samples are collected at the rate specified by the NYSDOH (less than 0.2 liters per minute).
- The sample tubing will be attached to the sampling canister with Swagelok™ fittings.
- Prior to sampling, the initial vacuum in each canister will be checked prior to use to ensure mechanical integrity of the canister. The initial vacuum should be approximately 30 inches mercury (in. Hg).
- To start sampling, the canister ball valve is opened and the initial time and vacuum is recorded.
- The final vacuum should be between 10 and 4 in. Hg, with a target of 5 in. of Hg. The initial and final vacuum in each canister will be recorded on the laboratory chain-of-custody form to be returned to the laboratory with the samples. The gauges provided with the canisters are

accurate only for “indication of change”, and are not sufficiently accurate to provide gauge-to- gauge comparisons. The final vacuum will also be measured in the laboratory.

- Following collection of the sample, the canister will be sealed by closing the ball valve and fitting on the canister inlet. The inlet will then be capped with a laboratory-provided threaded end cap.
- Following collection of the sample, the PID will be used to obtain a final reading from the probe assembly or tubing for the concentration of total organic vapors.
- Quality assurance and quality control samples will include one field duplicate, one trip blank, a laboratory blank and laboratory quality control samples as required by the analytical method.
- The site name, sample identification, canister number, canister certification number, sampler’s name, sample times and date will be recorded on a tag that is attached to each canister.
- The indoor air samples will be shipped overnight to a NY ELAP-certified laboratory for analysis.

The field sampling team will record all information regarding the sampling chain of custody. Information to be recorded will include the following: sample identification, date and times of sample collection, identity of the field personnel, sampling methods and equipment, purge volumes and rates, and any other relevant observations made during the sampling. A DOH indoor air quality questionnaire and building inventory form will also be filled out prior to indoor air sampling.

7.0 Air Monitoring

7.1 Introduction

Two types of air monitoring will be performed during the site investigation: 1) work zone monitoring for protection of the workers performing the site investigation, and 2) community air monitoring at the perimeter of the work site for protection of the local community.

7.1.1 Breathing Zone Air Monitoring During Drilling and Sampling

Monitoring of air in the breathing zone within the work site will be conducted periodically during all drilling and sampling activities. A PID will be used to monitor for VOCs or other organic vapors in the breathing zone and borehole, and to screen the samples.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The procedure for the PID operation and calibration is included in the HASP. Note that equipment calibration will be performed as often as needed to account for changing conditions or instrument readings. The minimum frequency of calibration is specified in the HASP; more frequent calibration will be performed if spurious readings are observed or there are other problems with the instruments.

7.1 Community Air Monitoring

The procedures and action levels for community air monitoring are presented in Appendix L of the SMP.

8.0 Field Instruments and Calibration

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Site Safety Coordinator (SSC). Copies of all of the instrument manuals will be maintained on site by the SSC. All changes to instrumentation will be noted in the field log book.

The following field instruments will be used during the investigation:

- PID
- Particulate monitors
- Multi-parameter meter (pH, specific conductivity, dissolved oxygen, oxidation reduction, turbidity, and temperature meter)

8.1 Portable Photo-Ionization Detector (PID)

- The photo-ionization detector will be equipped with either a 10.2 or 10.6 eV lamp. In this configuration, the PID is capable of ionizing and detecting compounds that account for over 70% of the VOCs on the USEPA Target Compound List.
- Calibration must be performed at the beginning of each day of use with a standard calibration gas having a concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, more frequent or additional calibration will be required.
- All calibration data must be recorded in the project field notebooks.
- A battery check must be completed at the beginning and end of each working day.
- All changes to the PID will be noted in the field notes (such as lamp or filter cleaning or replacement or change of instrument).

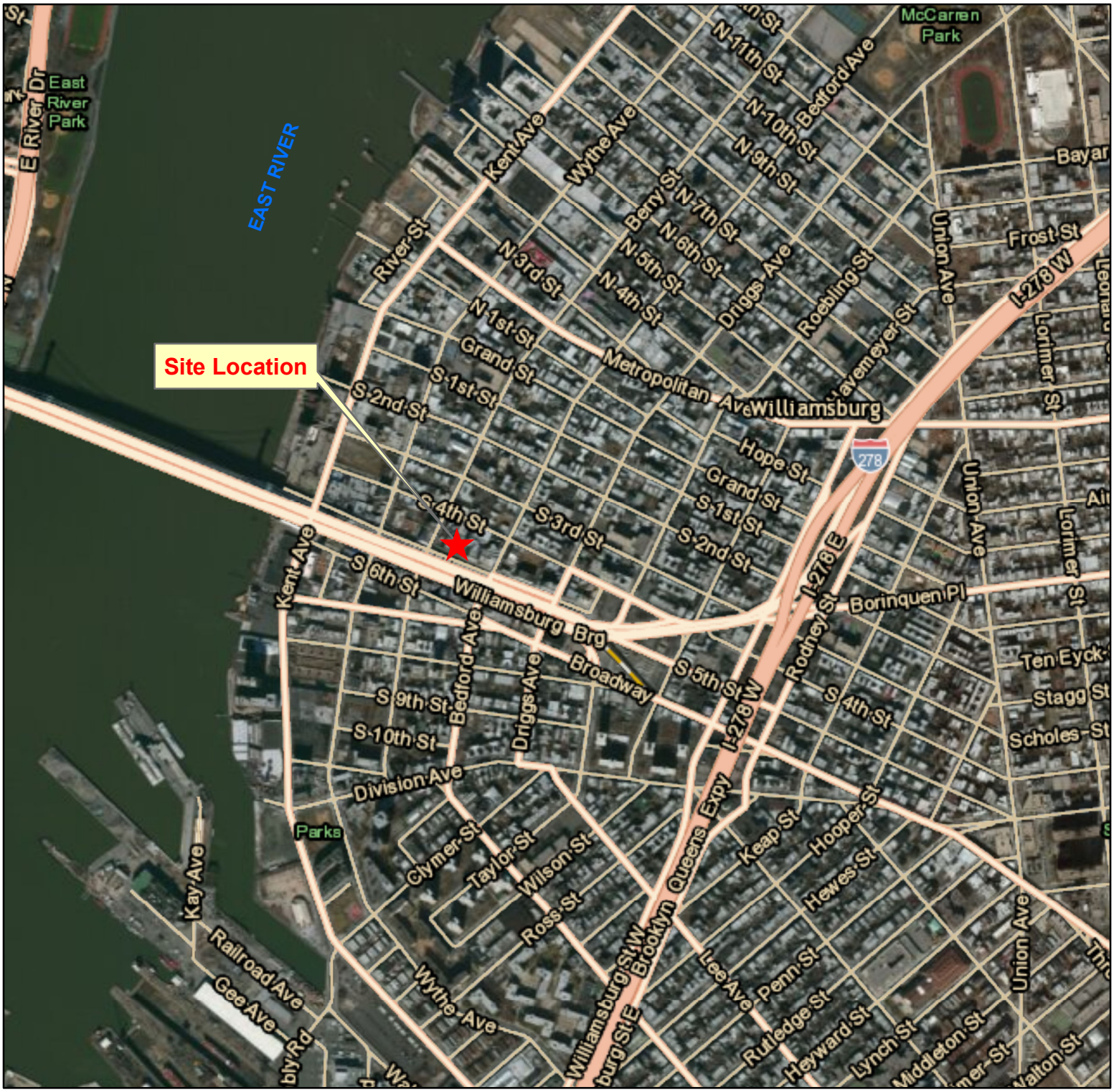
8.2 Multi-Parameter Meter

- Calibration of the meter (YSI or equivalent) must be performed at the start of each day of use, and after very high or low readings as required by this Plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard calibration solutions will be used (where applicable). At least one backup meter will also be present on-site in the event of a malfunction.
- The calibration data must be recorded in the project field book each time it is performed.

9.0 Analytical Program

The analytical procedures for the site are provided the QAPP in Appendix H of the SMP.

Figures



Notes: Aerial basemap provided by Esri, HERE, DeLorme, TomTom, MapmyIndia, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo;
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0 350 700 1,400 2,100 2,800 Feet

1 inch = 1,250 feet

N

FIGURE 1
SITE LOCATION MAP

337 Berry St. & 99-101 South 5th St.
(Block 2443 / Lots 6, 37, 41)
Brooklyn, New York

equity environmental engineering
227 Route 206, Suite 6, Flanders, NJ 07836, (973) 527-7451

DRAWN BY/ DATE	CHK/DATE	DRAWING NUMBER
NG / 04-14-15		2014074-01

0 40 80 160 240 320 Feet

1 inch = 208 feet

Notes:
Imagery basemap provided by ESRI;
Copyright:© 2011 / USA TOPOMAPS
National Geographic Society

FIGURE 2
SITE BOUNDARY MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
NG / 10-28-15		2015059-02

EQUITY ENVIRONMENTAL ENGINEERING, LLC

DRILLING RECORD

Sheet ____ of

Contractor: _____
Driller: _____
Inspector: _____
Rig Type: _____

PROJECT NAME: _____
PROJ. NUMBER: _____

boring #

Location Description:

Location Plan

GROUNDWATER OBSERVATIONS				
Water Level				
Date				
Time				
Meas. From				

Weather: _____

Date/Time Start: _____

Date/Time Finish: _____

Sample Depth	Sample I.D.	Inch Rec.	XRF Pb	PID (ppm)	USCS	FIELD IDENTIFICATION OF MATERIAL	SCHEMATIC	COMMENTS
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

COMMENTS:

SAMPLING METHOD

SS = SPLIT SPOON

A = AUGER CUTTINGS

GP = GEOPROBE - DIRECT PUSH

Equity Environmental Engineering	CLIENT:	SB/WELL ID:
500 International Drive, Suite 150	PROJECT:	PERMIT #:
Mount Olive, New Jersey 07828	LOCATION:	
START DATE:	DRILLING CO.:	TOTAL DEPTH:
COMPLETION DATE:	DRILLER:	WELL DEPTH:
BORING DIAMETER:	DRILL RIG / METHOD:	CASING ELEVATION:
WELL DIAMETER:	LOGGED BY:	DEPTH TO WATER:
SCREENED INTERVAL:	WELL TYPE:	WATER LEVEL STATIC:
SCREEN TYPE / SLOT:	FILTER PACK:	CASING TYPE:

Depth (Ft.)	Sample ID	Recovery (in.)	Interval (Ft.)	PID (ppm)	Reading At	Sample Type	H2O	Lithology / Remarks	Well Construction
0									0
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20

" Dia PVC

KEY:

SPT = Standard Penetration Test
CAL = Calibration
BZ = Breathing Zone
SS = Split Spoon
A = Auger Cuttings
GP = Geoprobe
BH = Bore Hole
GS = Grab Sample
C = Composite
HS = Headspace
V = Water Level
TOB = Top of Bentonite
TOSC = Top of Screen
TOS = Top of Sand
CB = Curb Box

Grout
Bentonite
Sand
Screen

SP-SM
SM
SP
ROCK
SW

GROUNDWATER SAMPLING LOG

SITE:
ADDRESS:

Monitoring Well: _____

Depth to Water (feet): _____ Date: _____
Total Well Depth (feet): _____ Samplers: _____
Casing Diameter (inches): _____
Water Column (feet): _____ Weather Conditions:_____
Water Column Volume (gallons): _____
Screened/Open Interval: _____

Purging Information

Start Time: _____ Purge Method: *(Circle One)*
End Time: _____
Purge Rate (gpm or/ lpm): _____ Centrifugal pump **Dedicated Low Flow**
Total Volume Removed: _____ (**Gallons** or/ Liters) Submersible Pump Bailer
Peristaltic Pump Other: _____

Time										
Volume (Liters/Gallons)										
Depth to Water										
Temperature (deg. C)*										
pH										
ORP/Redox										
Conductivity (mS/cm)* [S/m]										
Turbidity (NTU)										
DO (mg/L)*										
TDS										
Salinity (ppt)										

* Make sure meter are set to read in these settings - ex. DO is set to mg/L not %.

Sampling Information

Sample ID: _____ Sampling Method/Equipment: Pump Intake Depth: _____

Sample Time:_____ Depth to Water:_____

Analyte Group	**Bottle Type**	**Number**	**Preservation**	**Analyzed?**

Metals Filtered? Yes / No
Sample Rate (gpm/lpm):_____

Comments/Observations for sampling event pertaining to this well:

Misc Field Info/Reference:

Well Volume:

Case Dia (inches):	2	3	4	4.5	5	6	8	12
Gallons/linear Foot:	0.17	0.38	0.66	0.83	1.02	1.5	2.6	5.8

For Low Flow

Stabilization Order/Range
Three successive reading within:

*pH:	+/- 0.1	
*SC (Conductivity):	+/- 3%	SC - Specific Conductance
ORP:	+/- 10mV	
*DO:	+/- 10%	
Turb:	+/- 10% for levels greater than 1 NTU	
Temp:	+/- 3%	
Water Level Drawdown:	<0.3 ft	

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

_____

_____

_____

Airflow near source

_____

_____

_____

Outdoor air infiltration

_____

_____

_____

Infiltration into air ducts

_____

_____

_____

5. **BASEMENT AND CONSTRUCTION CHARACTERISTICS** (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other _____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	uncovered	covered	covered with _____	
e. Concrete floor:	unsealed	sealed	sealed with _____	
f. Foundation walls:	poured	block	stone	other _____
g. Foundation walls:	unsealed	sealed	sealed with _____	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. **HEATING, VENTING and AIR CONDITIONING** (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other_____
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

_____

_____

_____

_____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	_____
1st Floor	_____
2nd Floor	_____
3rd Floor	_____
4th Floor	_____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA
Please specify_____

d. Has the building ever had a fire? Y / N When?_____

e. Is a kerosene or unvented gas space heater present? Y / N Where?_____

f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____

g. Is there smoking in the building? Y / N How frequently? _____

h. Have cleaning products been used recently? Y / N When & Type? _____

i. Have cosmetic products been used recently? Y / N When & Type? _____

j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____

k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____

l. Have air fresheners been used recently? Y / N When & Type? _____

m. Is there a kitchen exhaust fan? Y / N If yes, where vented? _____

n. Is there a bathroom exhaust fan? Y / N If yes, where vented? _____

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type? _____

Are there odors in the building? Y / N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: _____
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

APPENDIX K

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR THE WILLIAMSBURG BRIDGEVIEW APARTMENTS

TABLE OF CONTENTS

APPENDIX L

PERMITS AND/OR PERMIT EQUIVALENT

NYC Buildings

Work Permit Department of Buildings

Permit Number: *320597378-01-FO-EA*

Issued: *05/15/2018* Expires: *05/15/2019*

Address: *BROOKLYN 101 SOUTH 5TH STREET*

Issued to: JOSEPH PROCIDA

Business: PROCIDA CONSTRUCTION CORP

Contractor No: GC-1863

Description of Work:

NEW BUILDING - EARTHWORK CONSTRUCT NEW 11 STORY MIXED USE BUILDING.

Review is requested under Building Code: 2008

SITE FILL: USE UNDER 300 C

To see a Zoning Diagram (ZD1) or to challenge a zoning approval filed as part of a New Building application or Alteration application filed after 7/13/2009, please use "My Community" on the Buildings Department web site at www.nyc.gov/buildings.

Emergency Telephone Day or Night: 311 *SITE SAFETY PHONE : 212 669-7043*

Borough Commissioner: Commissioner of Buildings:

Tampering with or knowingly making a false entry in or falsely altering this permit is a crime that is punishable by a fine, imprisonment or both.

03 07/26/2018

OP-35A (5/10)

APPENDIX M
RESPONSIBILITIES OF OWNER

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the Williamsburg Bridgeview Apartments site (the "site"), number C224233, are to be implemented by the site beneficial owner who is also the Remedial Party, as defined below. The beneficial owner(s) is/are currently listed LPC Development Group LLC (owner).

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is also the owner.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Beneficial Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the NYSDEC in accordance with the timeframes indicated in Section 1.3-Notifications.

6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the NYSDEC in accordance with the time frame indicated in 1.3-Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

For this site, the beneficial owner is the RP.

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3- Notifications of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in Appendix H (Operation, Monitoring and Maintenance Manual) of the SMP.

8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site

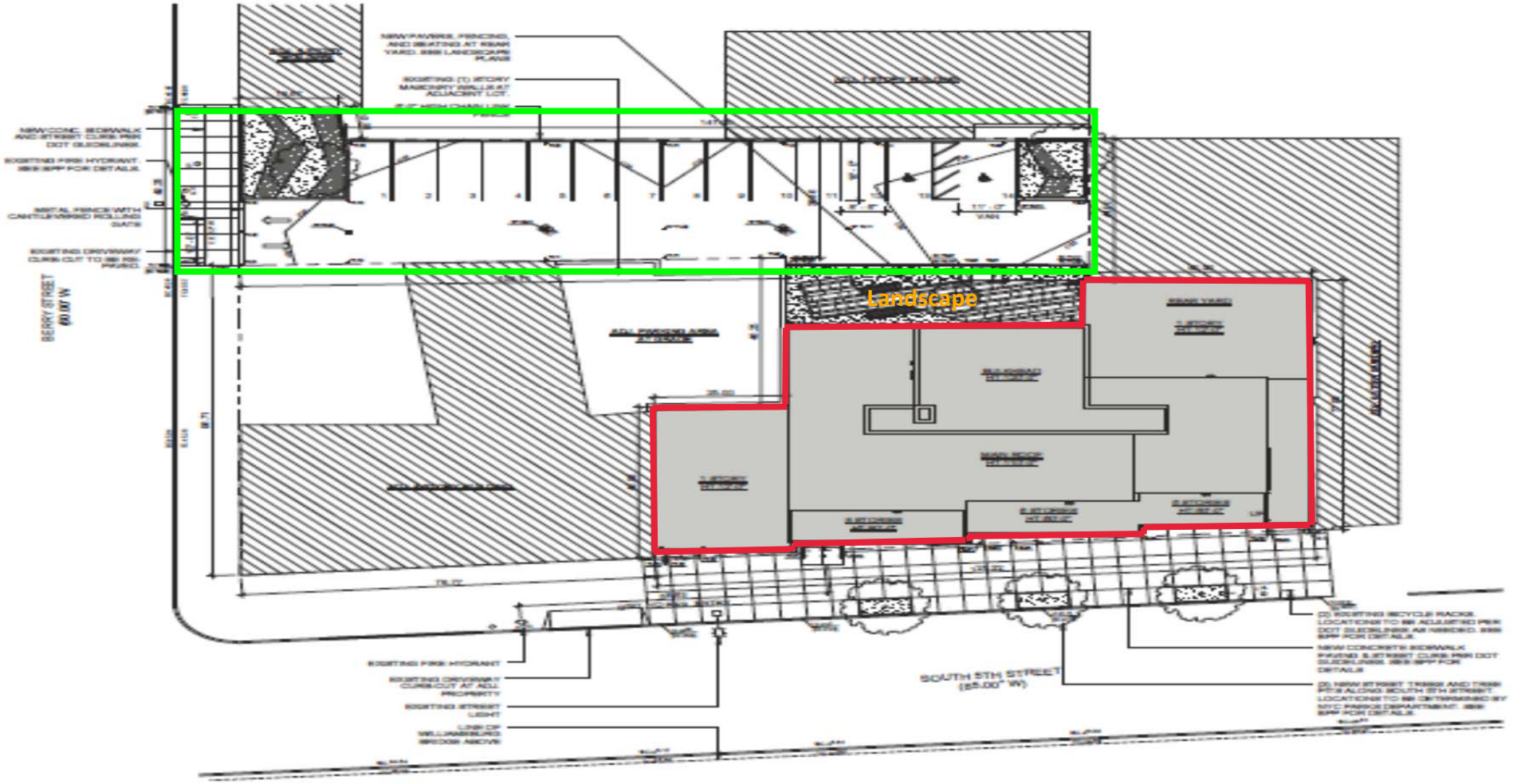
may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

Appendix B

Cover System



Note: Drawing is not drawn to scale. Original drawing copied from "Figure 5: Proposed Site Plan" created by Dattner Architects, D.P.C.

SSDS

SVE

FIGURE 8
Engineering Controls

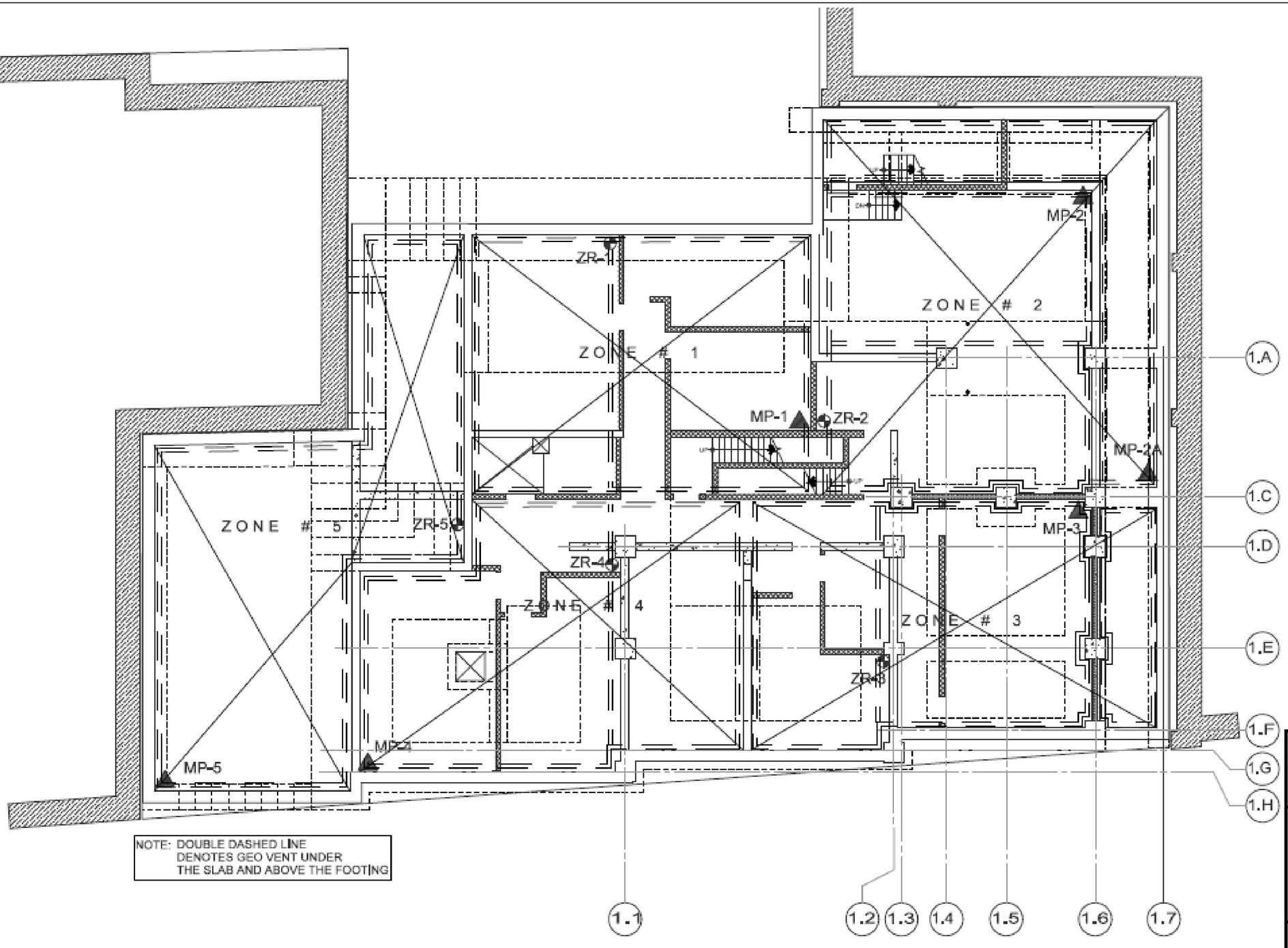
337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

Drawn By: NG/11-06-15 | Drawing Number: 2015059-03

Appendix C

Sub-Slab Depressurization System Layout



Legend

- MP-1 - Monitoring Point
- ZR-1 - Extraction Point
- Geovent

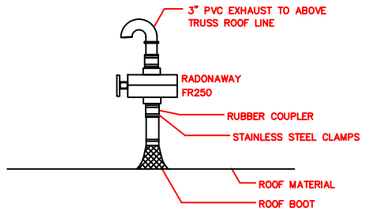
FIGURE 5
Sub-Slab Depressurization Systems

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

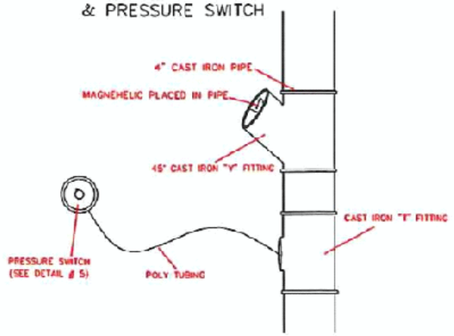
equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
JV / 01-03-17		2015059-05

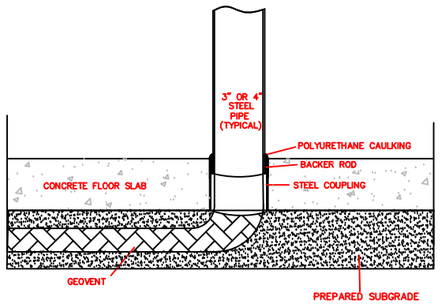
DETAIL # 1
ROOF MOUNTED RADON–AWAY
FR250 BLOWER AND
SUPPORT DETAIL (OTHER TYP. DETAIL)



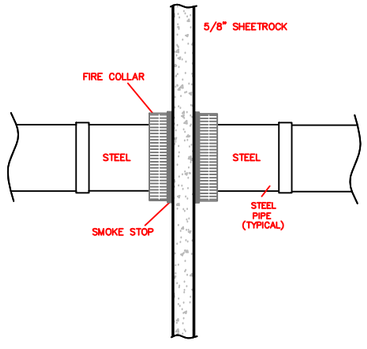
DETAIL # 2
DWYER MINI–MAGNEHELIC(0–5.0 PSI)
& PRESSURE SWITCH



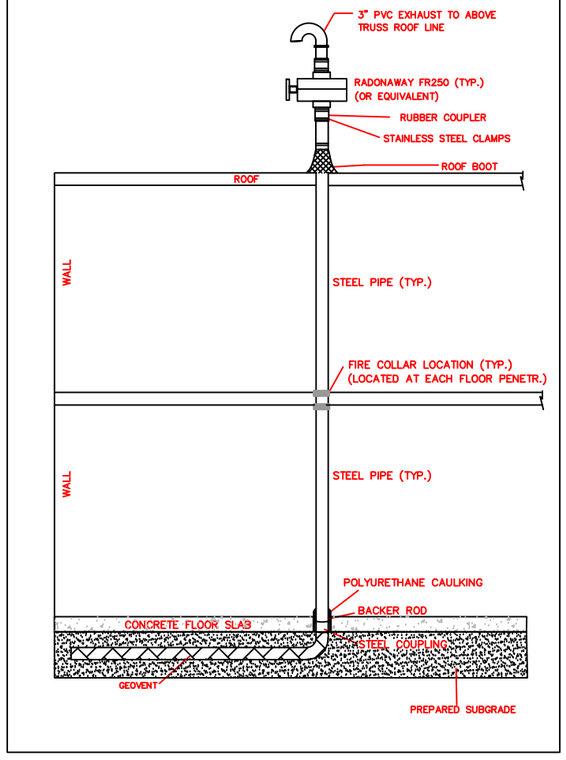
DETAIL # 3
SUCTION POINT (TYP.)



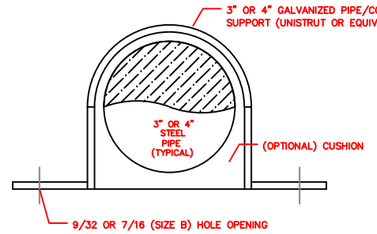
DETAIL # 4
HORIZONTAL WALL PENETRATION (TYP.)
& FIRE COLLAR DETAIL (TYP.)



DETAIL # 5
COMPLETE SYSTEM INSTALLATION
& ROOF PENETRATION



DETAIL # 6
PIPE HANGER DETAIL



DETAIL # 7
BELOW GRADE BEAM PIPING

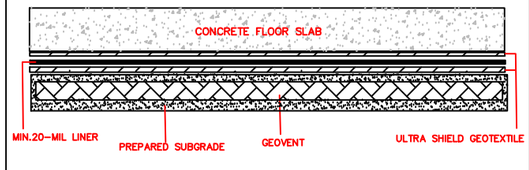


FIGURE 6

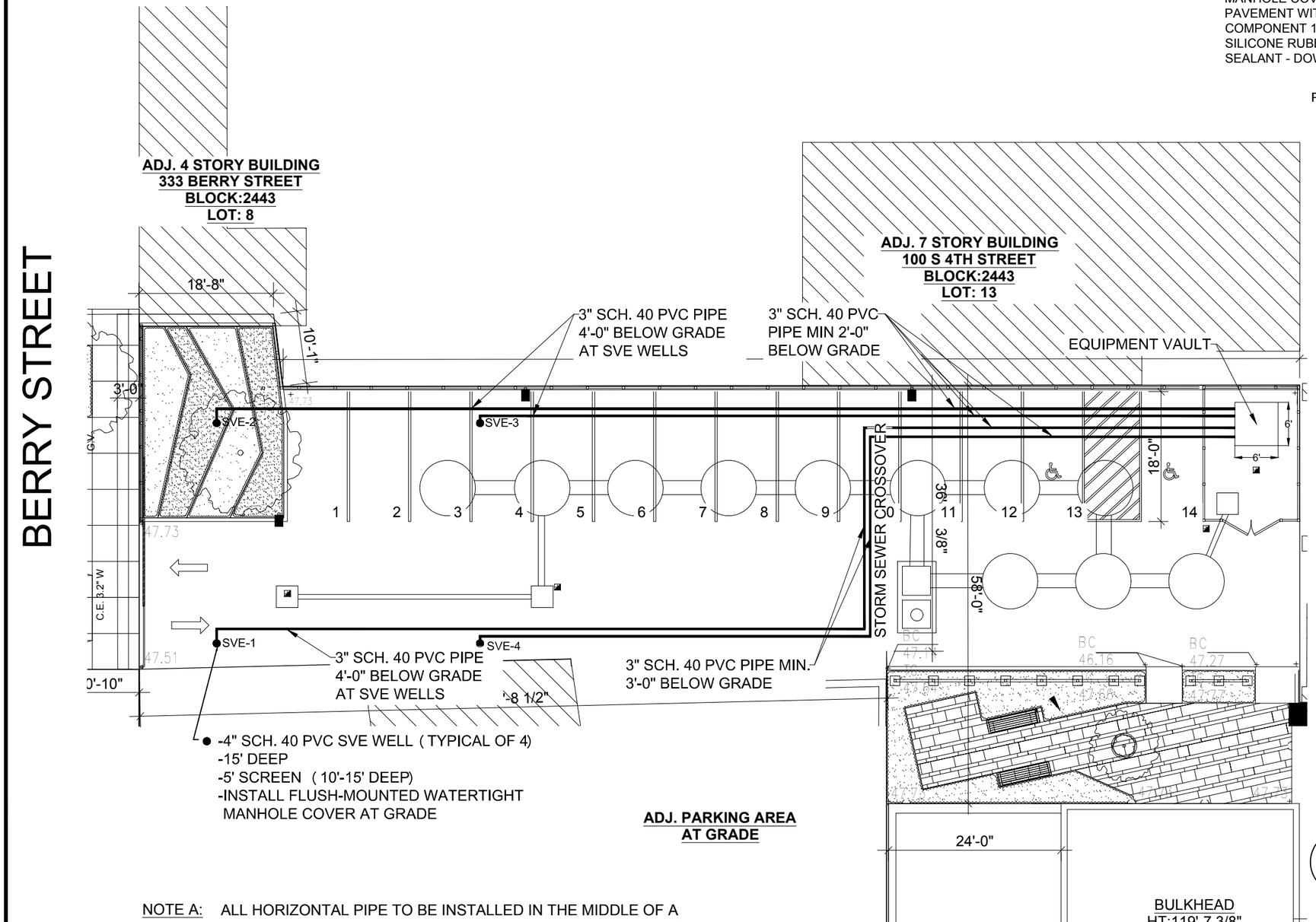
VAPOR MITIGATION SYSTEM
337 BERRY STREET
BROOKLYN, NEW YORK
DETAIL SHEET

Equity Environmental Engineering LLC
500 International Drive, Suite 150
Mt. Olive, NJ 07828
Phone: (973) 527-7451

DATE	DWG BY	REV	CHK
11082016	TAF	FU	

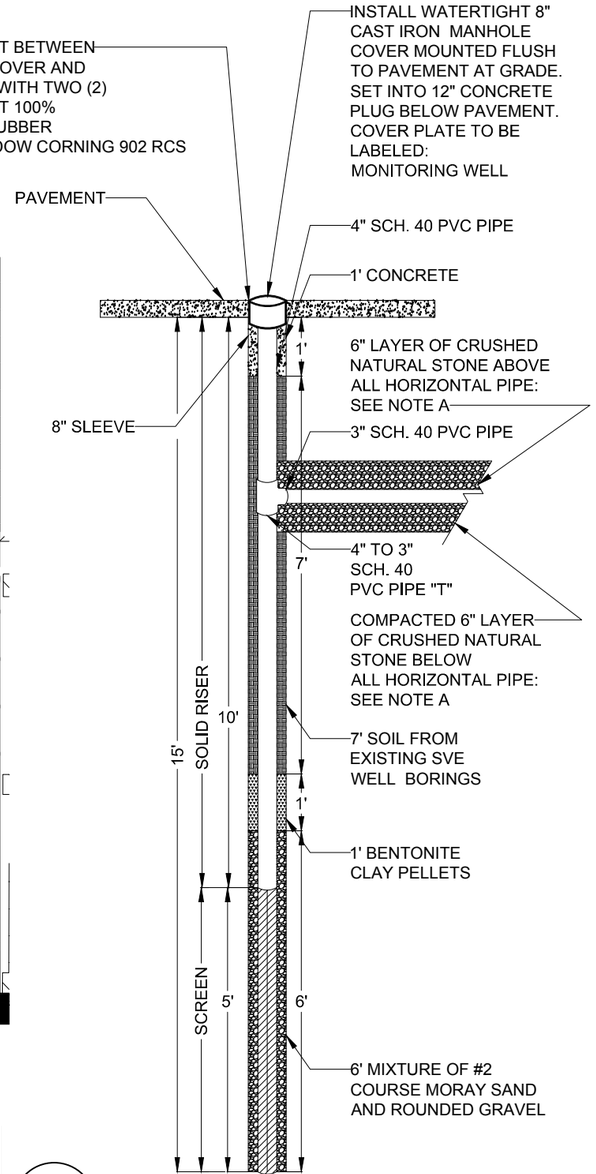
Appendix D

Soil Vapor Extraction System Layout and Logged Data



NOTE A: ALL HORIZONTAL PIPE TO BE INSTALLED IN THE MIDDLE OF A 12" LAYER OF CRUSHED NATURAL BLUESTONE, MINIMUM OF $\frac{3}{4}$" SIZE, FREE OF ALL FRIABLE MATERIAL AND DEBRIS, GRADED IN ACCORDANCE WITH ASTM C136; ALL MATERIAL TO BE ABLE TO PASS THROUGH A 2" SEIVE.

NOTE B: SVE WELL QUANTITY AND LOCATIONS ARE SUBJECT TO PILOT WELL TESTING.



SVE 1–4 SOIL VAPOR EXTRACTION WELL

SCALE: 3/8"=1'–0"

- FINE TO COURSE SAND AND ROUNDED GRAVEL
- BENTONITE PELLETS
- BANK RUN SAND AND GRAVEL
- CONCRETE
- SVE — SOIL VAPOR EXTRACTION WELL

ANDREW ROBERT LEVENBAUM P.E.
424 NEW YORK AVENUE
HUNTINGTON, NY 11743
T-631-423-6602 F-631-423-4013

STRUCTURAL CONSULTANT:

MEPS CONSULTANT:

NO	DESCRIPTION	DATE

PROJECT DATA:

ALTERATIONS & ADDITIONS TO:
337 BERRY STREET
BROOKLYN, NY, 11249

JOB NUMBER: 593

DOB BSCAN:

DRAWING TITLE:
SITE PLAN

DRAWN BY: SCF | CHECKED BY: ARL

SCALE: $\frac{1}{16}$"=1'-0" | DATE: 06.05.17

C-101.00
1 of 1

Presentation Management Contact Logout

System

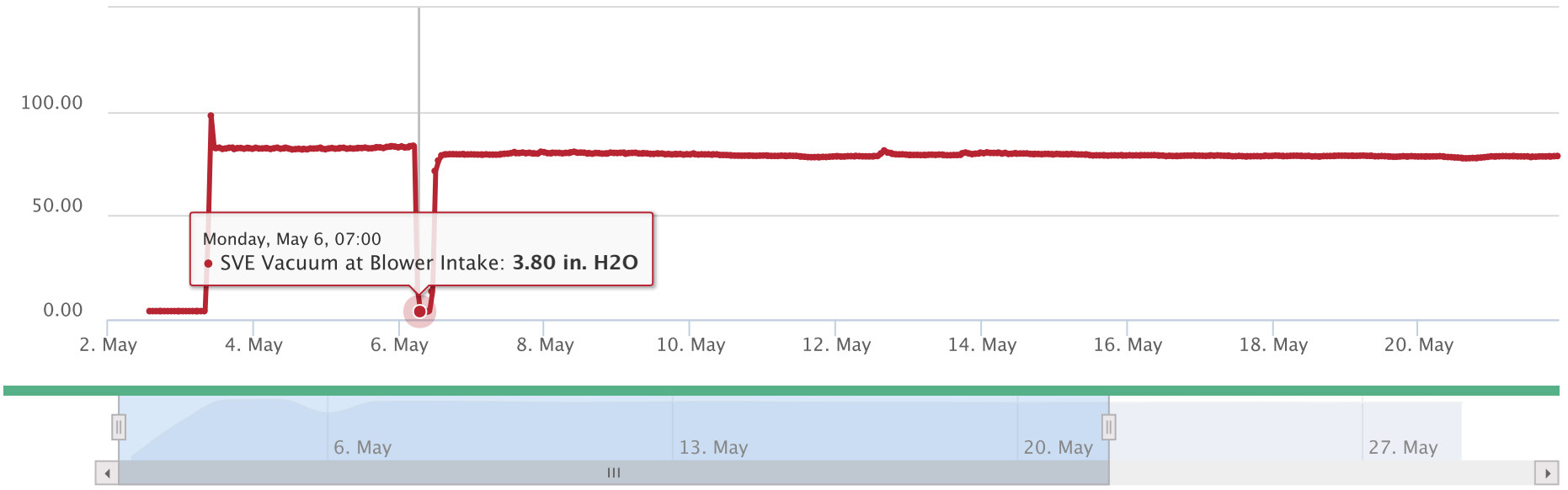
Logged In: Paul Stewart
Account: BerryBrooklyn

SVE Vacuum Overview Alarm Historical data Browse devices Map Information

Time zone US/Eastern

Aggregated hour data

Zoom 1d 1w 1m 3m 6m YTD 1y All From 2019-05-02 00:00 To 2019-05-21 22:14



Available Parameters:

Drag the parameter here to remove it from the chart

Left Axis:

SVE Vacuum at Blower Intake
SVE Vacuum in. H2O

Drag the parameter(s) here

Right Axis:

Drag the parameter(s) here

Argos

Appendix E

SVES Implementation Plan

Advanced Cleanup Technologies, Inc.
ENVIRONMENTAL CONSULTANTS

August 8, 2017

Mr. Peter Procida
LPC Developmet Group LLC
456 East 173rd Street
Bronx, New York 10457

Re: Soil Vapor Extraction System Implementation Plan
337 Berry Street, Brooklyn, New York

Dear Mr. Procida,

Advanced Cleanup Technologies, Inc. (ACT) is pleased to present the following Implementation Plan for the construction of the proposed Soil Vapor Extraction (SVE) system at 337 Berry Street, Brooklyn, New York. A preliminary design plan providing the proposed number and layout of SVE wells and system piping is attached. A Typical P&ID diagram for the SVE system is also attached.

The following outlines the details of construction and the methodology and sequencing of the construction related activities. The ground surface over the area to be remediated is currently bare dirt. Hence, vacuum measurements recorded during pilot testing will be viewed as conservative, with higher vacuum anticipated once the asphalt pavement has been installed.

Scope of Work

1. **Pilot Testing**

   The New York State Department of Health (NYSDOH) has indicated that a minimum vacuum of 0.1 in. w.c. is required to maintain an effective vacuum within an area influenced by an SVE system. A pilot test will be performed on an SVE well to be installed along the property boundary adjacent to 333 Berry Street to generate site-specific permeability data under varying conditions of pressure, flow and distance.

   Prior to pilot testing, temporary vacuum points will be installed at 5, 10 and 15 foot depths along the property boundary with 333 Berry Street and at one 10-foot step out to the south. Temporary sub-slab vacuum points (less than 6 in. deep) will also be installed inside the basement at 333 Berry Street at three distances from the southern property boundary.

The results of the pilot test will document the extraction well vacuum and flow rates required to maintain effective horizontal and vertical pressure fields beneath the site and its immediate vicinity. This information will be used to refine the proposed layout of the SVE system and sizing of vacuum blower and treatment equipment. The blower will be selected with approval from the NYSDEC.

2. Trenching

A backhoe will be utilized to dig a trench from each extraction well to lateral piping connecting the SVE well to the vacuum system. An additional trench will be dug along the northern property boundary to contain lateral piping from each SVE well to the vacuum system.

3. Extraction Well Installation

Each SVE well will be installed utilizing a rotary auger drill rig, which will drill an 8-inch diameter borehole to a depth of 15 feet below ground surface (bgs). The entire well assembly, including 5 feet of 4-inch diameter 20 mil slotted schedule 40 PVC well screen and 10 feet of 4-inch diameter solid PVC riser pipe, will be inserted into the borehole. A 4-inch to 3-inch PVC "T" will be installed four feet from the top of the well casing to provide connection to lateral piping.

The borehole will be filled with 6 feet of well gravel (#2 moray sand and rounded gravel) followed by 1 foot of hydrated bentonite clay pellets and then native soil to 1-foot bgs. An 8-inch diameter well cover labeled "Monitoring Well" will be installed at an elevation flush with the asphalt surface. The well cover will be secured in place with a concrete plug, inhibiting surface water infiltration into the well annulus.

4. Lateral Piping Installation

A 6-inch layer of crushed natural bluestone will be placed in the base of each pipe trench. A layer of filter fabric will be placed between the bluestone and the native soil. Three-inch diameter schedule 40 PVC piping will be laid out in the trenches in 10-foot sections. Each section will be welded to the next with PVC primer and cement. Care will be taken to make sure PVC couplings are fully inserted and dry before moving to the next section. Lateral piping will be covered with a 6-inch layer of crushed stone. The trenches will then be backfilled with native soil to grade.

5. Vacuum System Installation

Located in the northeast portion of the asphalt driveway, a vacuum system consisting of a vacuum blower, moisture separator, pre-filter, instrumentation and controls will be installed within a pre-fabricated metal enclosure. (See Attachment A for the proposed location of the vacuum system).

The enclosure will be soundproofed to reduce the sound level of the blower. Provisions to alternatively mount the vacuum system and enclosure on the roof of the building under construction will be made if it is determined that this would be a more suitable location.

6. Exhaust Treatment

Prior to operational startup, the vacuum system exhaust will be sampled and analyzed for volatile organic compounds pursuant to EPA Method TO-15. An ambient Air Quality Impact Analysis will be performed in accordance with NYS DAR-1 guidelines to determine if treatment of exhaust with granular activated carbon will be required.

7. Electrical Work

The vacuum system will be energized using a new electrical distribution panel installed by the client. Circuit breakers will be labeled “Active Soil Vapor Extraction System.” Additionally, a system description label will be placed on the vacuum system enclosure and control panel.

Electrical conduit and wire will be run in a manner that meets or exceeds the NYC electrical code to the enclosure where the control panel will be located. A disconnect switch will be provided outside the enclosure which will serve as a local means of disconnect for emergency or maintenance use.

8. System Testing and Startup

Prior to the startup of the SVE system, the vacuum blower and controls will be tested for correct operation, both electrically and mechanically.

Temporary sub-slab vacuum points (less than 6 in. deep) will be installed inside the basements at 333 and 345 Berry Street. A minimum of 6 temporary vacuum points will be installed to verify that adequate vacuum is reaching each of the points.

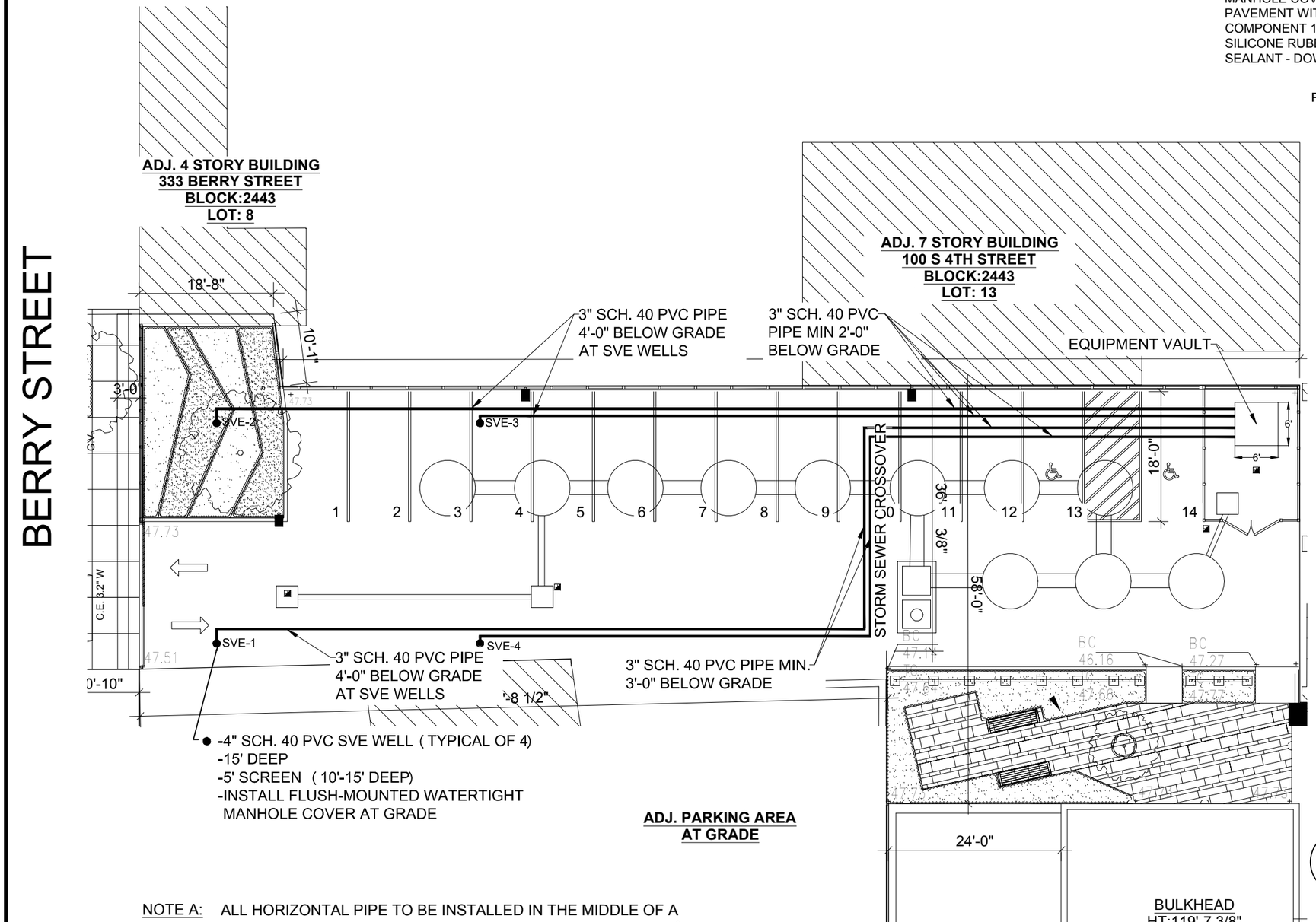
Each of the vacuum points will be connected to a hand-held digital manometer to check for vacuum influence. This vacuum influence will be used to demonstrate that the SVE system is providing adequate depressurization coverage.

Following startup of the SVE system, the flow, vacuum, temperature and vapor concentrations in the influent and effluent will be monitored on a daily basis for the first 7 to 10 days and then monthly thereafter.

If you have any questions or require additional information, please do not hesitate to contact the undersigned.

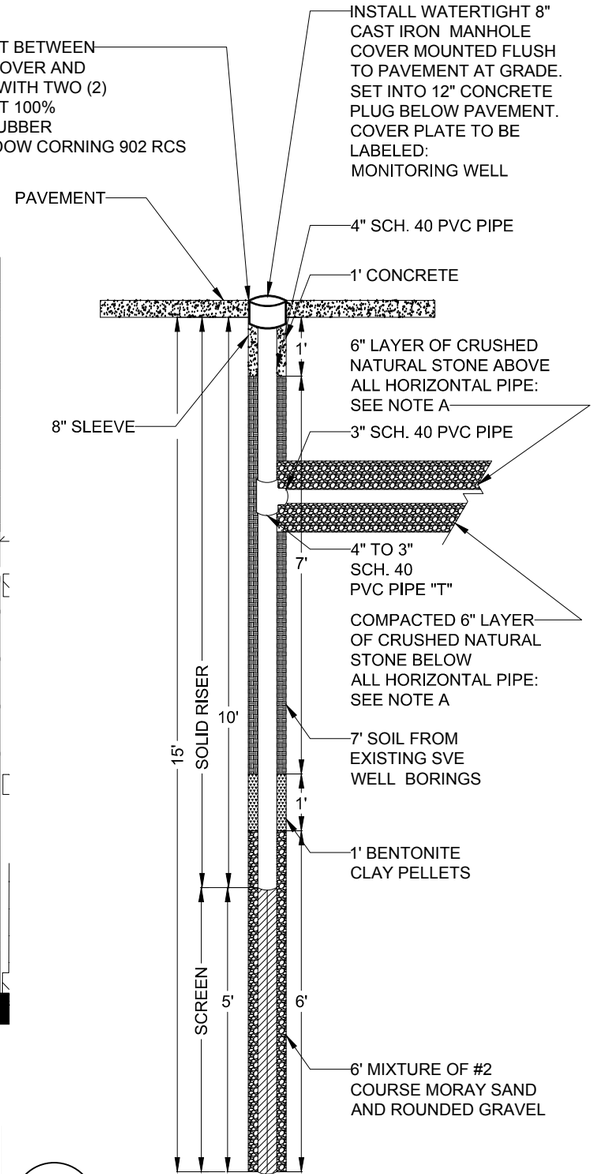
Very truly yours,

Paul P. Stewart, QEP
President



NOTE A: ALL HORIZONTAL PIPE TO BE INSTALLED IN THE MIDDLE OF A 12" LAYER OF CRUSHED NATURAL BLUESTONE, MINIMUM OF $\frac{3}{4}$" SIZE, FREE OF ALL FRIABLE MATERIAL AND DEBRIS, GRADED IN ACCORDANCE WITH ASTM C136; ALL MATERIAL TO BE ABLE TO PASS THROUGH A 2" SEIVE.

NOTE B: SVE WELL QUANTITY AND LOCATIONS ARE SUBJECT TO PILOT WELL TESTING.



SVE 1–4 SOIL VAPOR EXTRACTION WELL

SCALE: 3/8"=1'–0"

- FINE TO COURSE SAND AND ROUNDED GRAVEL
- BENTONITE PELLETS
- BANK RUN SAND AND GRAVEL
- CONCRETE
- SVE — SOIL VAPOR EXTRACTION WELL

ANDREW ROBERT LEVENBAUM P.E.
424 NEW YORK AVENUE
HUNTINGTON, NY 11743
T-631-423-6602 F-631-423-4013

STRUCTURAL CONSULTANT:

MEPS CONSULTANT:

NO	DESCRIPTION	DATE

PROJECT DATA:

ALTERATIONS & ADDITIONS TO:
337 BERRY STREET
BROOKLYN, NY, 11249

JOB NUMBER: 593

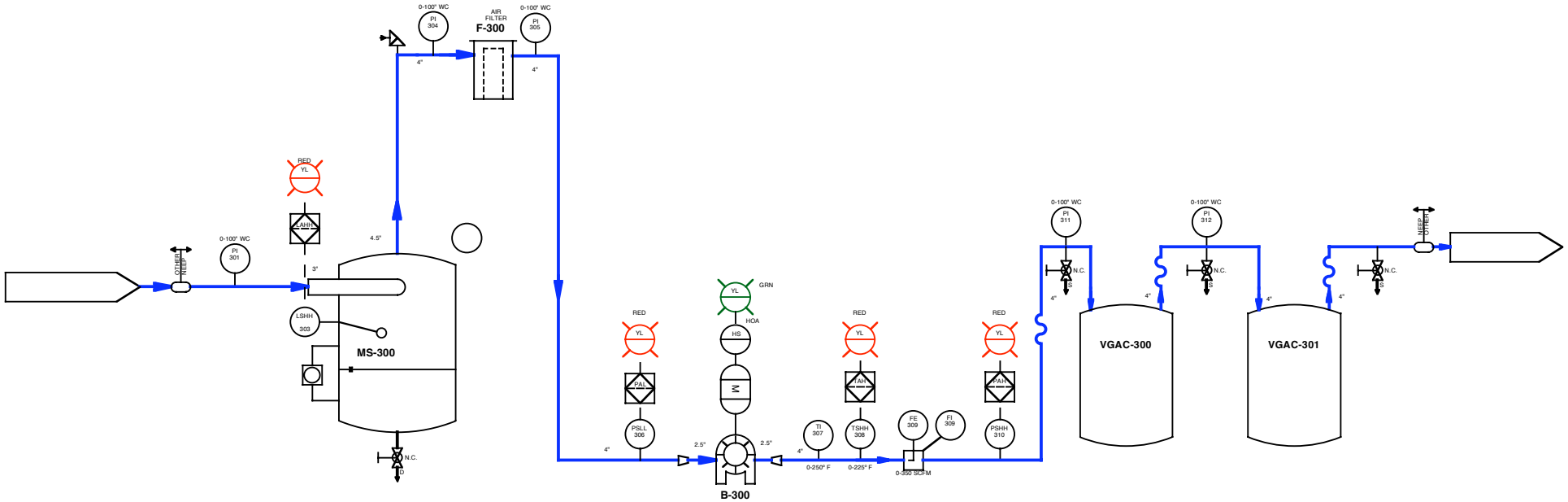
DOB BSCAN:

DRAWING TITLE:
SITE PLAN

DRAWN BY: SCF | CHECKED BY: ARL

SCALE: $\frac{1}{16}$"=1'-0" | DATE: 06.05.17

C-101.00
1 of 1


0-100" WC
PI 304
AIR FILTER
F-300
0-100" WC
PI 305
4"
4"
RED
YL
ANH
0-100" WC
PI 301
OTHER
NEEP
4.5"
3"
LSHH 303
MS-300
N.C.
D
RED
YL
PAL
PSLL 306
4"
2.5"
YL
GRN
HOA
HS
M
2.5"
B-300
RED
YL
PAM
TSHH 308
TI 307
4"
0-250° F
0-225° F
FE 309
FI 309
0-350 SCFM
RED
YL
PAM
PSHH 310
0-100" WC
PI 311
N.C.
D
4"
VGAC-300
0-100" WC
PI 312
N.C.
S
4"
4"
VGAC-301
4"
N.C.
S
NEEP
OTHER

TYPICAL P&ID

Appendix F

Certified Laboratory Reports

Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Report Date: 03/18/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19C0387

Report Date: 03/18/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19C0387

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on March 12, 2019 with a temperature of C. The project was identified as your project: **9311-BKNY**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
19C0387-01	9311-INF	Vapor Extraction	03/11/2019	03/12/2019
19C0387-02	9311-EFF	Vapor Extraction	03/11/2019	03/12/2019

General Notes for York Project (SDG) No.: 19C0387

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 03/18/2019

Benjamin Gulizia
Laboratory Director

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19C0387-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	2.0	2.966	EPA TO-15 Certifications:	03/14/2019 09:00	03/15/2019 11:41	AS
71-55-6	**1,1,1-Trichloroethane**	**18**		ug/m³	1.6	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	2.0	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	2.3	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	1.6	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
75-34-3	1,1-Dichloroethane	ND		ug/m³	1.2	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
75-35-4	**1,1-Dichloroethylene**	**9.9**		ug/m³	0.29	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	2.2	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
95-63-6	**1,2,4-Trimethylbenzene**	**47**		ug/m³	1.5	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
106-93-4	1,2-Dibromoethane	ND		ug/m³	2.3	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	1.8	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
107-06-2	1,2-Dichloroethane	ND		ug/m³	1.2	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
78-87-5	1,2-Dichloropropane	ND		ug/m³	1.4	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	2.1	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
108-67-8	**1,3,5-Trimethylbenzene**	**17**		ug/m³	1.5	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
106-99-0	1,3-Butadiene	ND		ug/m³	2.0	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
541-73-1	**1,3-Dichlorobenzene**	**3.0**		ug/m³	1.8	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	1.4	2.966	EPA TO-15 Certifications:	03/14/2019 09:00	03/15/2019 11:41	AS
106-46-7	**1,4-Dichlorobenzene**	**2.0**		ug/m³	1.8	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
123-91-1	1,4-Dioxane	ND		ug/m³	2.1	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS
78-93-3	**2-Butanone**	**8.6**		ug/m³	0.87	2.966	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/14/2019 09:00	03/15/2019 11:41	AS

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19C0387-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	* 2-Hexanone	ND		ug/m³	2.4	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	4.6	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	1.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-64-1	**Acetone**	**8.2**		ug/m³	1.4	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
107-13-1	Acrylonitrile	ND		ug/m³	0.64	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
71-43-2	Benzene	ND		ug/m³	0.95	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
100-44-7	Benzyl chloride	ND		ug/m³	1.5	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-27-4	Bromodichloromethane	ND		ug/m³	2.0	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-25-2	Bromoform	ND		ug/m³	3.1	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-83-9	Bromomethane	ND		ug/m³	1.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-15-0	Carbon disulfide	ND		ug/m³	0.92	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
56-23-5	**Carbon tetrachloride**	**0.56**		ug/m³	0.47	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-90-7	Chlorobenzene	ND		ug/m³	1.4	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-00-3	Chloroethane	ND		ug/m³	0.78	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-66-3	**Chloroform**	**19**		ug/m³	1.4	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-87-3	Chloromethane	ND		ug/m³	0.61	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-59-2	**cis-1,2-Dichloroethylene**	**5.8**		ug/m³	0.29	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-82-7	Cyclohexane	ND		ug/m³	1.0	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
124-48-1	Dibromochloromethane	ND		ug/m³	2.5	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-71-8	**Dichlorodifluoromethane**	**3.2**		ug/m³	1.5	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
141-78-6	* Ethyl acetate	ND		ug/m³	2.1	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:			

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19C0387-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**11**		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	3.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	**Isopropanol**	**2.7**		ug/m³	1.5	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	Methyl Methacrylate	ND		ug/m³	1.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	1.1	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	Methylene chloride	ND		ug/m³	2.1	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	n-Heptane	ND		ug/m³	1.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	n-Hexane	ND		ug/m³	1.0	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**41**		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**72**		ug/m³	2.6	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	*** p-Ethyltoluene**	**37**		ug/m³	1.5	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.51	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
127-18-4	**Tetrachloroethylene**	**460**		ug/m³	0.50	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
109-99-9	*** Tetrahydrofuran**	**17**		ug/m³	1.7	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications:			
108-88-3	**Toluene**	**64**		ug/m³	1.1	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	1.2	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-01-6	**Trichloroethylene**	**320**		ug/m³	0.40	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-69-4	**Trichlorofluoromethane (Freon 11)**	**2.3**		ug/m³	1.7	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-05-4	Vinyl acetate	ND		ug/m³	1.0	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
593-60-2	Vinyl bromide	ND		ug/m³	1.3	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19C0387-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND		ug/m³	0.19	2.966	EPA TO-15	03/14/2019 09:00	03/15/2019 11:41	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*129 %*	*70-130*

Sample Information

Client Sample ID: 9311-EFF

York Sample ID: 19C0387-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.91	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.72	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.91	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.0	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.72	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.54	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.13	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	0.98	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-63-6	**1,2,4-Trimethylbenzene**	**1.5**		ug/m³	0.65	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.0	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.80	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.54	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF

York Sample ID: 19C0387-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.61	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.93	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-67-8	1,3,5-Trimethylbenzene	ND		ug/m³	0.65	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-99-0	1,3-Butadiene	ND		ug/m³	0.88	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
541-73-1	**1,3-Dichlorobenzene**	**1.7**		ug/m³	0.80	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.61	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.80	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
123-91-1	1,4-Dioxane	ND		ug/m³	0.96	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
78-93-3	**2-Butanone**	**2.2**		ug/m³	0.39	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	2.1	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	0.54	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-64-1	**Acetone**	**5.1**		ug/m³	0.63	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-13-1	Acrylonitrile	ND		ug/m³	0.29	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
71-43-2	**Benzene**	**0.64**		ug/m³	0.42	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
100-44-7	Benzyl chloride	ND		ug/m³	0.69	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-27-4	Bromodichloromethane	ND		ug/m³	0.89	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-25-2	Bromoform	ND		ug/m³	1.4	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
74-83-9	Bromomethane	ND		ug/m³	0.52	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-15-0	Carbon disulfide	ND		ug/m³	0.41	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
56-23-5	Carbon tetrachloride	ND		ug/m³	0.21	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-90-7	Chlorobenzene	ND		ug/m³	0.61	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF

York Sample ID: 19C0387-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-00-3	Chloroethane	ND		ug/m³	0.35	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-66-3	Chloroform	ND		ug/m³	0.65	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
74-87-3	**Chloromethane**	**47**		ug/m³	0.27	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-59-2	cis-1,2-Dichloroethylene	ND		ug/m³	0.13	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.60	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-82-7	Cyclohexane	ND		ug/m³	0.46	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
124-48-1	Dibromochloromethane	ND		ug/m³	1.1	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-71-8	**Dichlorodifluoromethane**	**0.66**		ug/m³	0.66	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
141-78-6	* Ethyl acetate	ND		ug/m³	0.96	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
100-41-4	Ethyl Benzene	ND		ug/m³	0.58	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.4	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	**Isopropanol**	**2.3**		ug/m³	0.65	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	Methyl Methacrylate	ND		ug/m³	0.54	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.48	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	Methylene chloride	ND		ug/m³	0.92	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	n-Heptane	ND		ug/m³	0.54	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	n-Hexane	ND		ug/m³	0.47	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**1.0**		ug/m³	0.58	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**2.1**		ug/m³	1.2	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	* **p-Ethyltoluene**	**1.2**		ug/m³	0.65	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.23	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.57	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF **York Sample ID:** 19C0387-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C0387	9311-BKNY	Vapor Extraction	March 11, 2019 1:30 pm	03/12/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
127-18-4	**Tetrachloroethylene**	**0.27**		ug/m³	0.23	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
109-99-9	*** Tetrahydrofuran**	**4.2**		ug/m³	0.78	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:			
108-88-3	**Toluene**	**1.8**		ug/m³	0.50	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.53	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.60	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-01-6	Trichloroethylene	ND		ug/m³	0.18	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-69-4	Trichlorofluoromethane (Freon 11)	ND		ug/m³	0.75	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-05-4	Vinyl acetate	ND		ug/m³	0.47	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
593-60-2	Vinyl bromide	ND		ug/m³	0.58	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-01-4	Vinyl Chloride	ND		ug/m³	0.085	1.327	EPA TO-15	03/14/2019 09:00	03/15/2019 12:33	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

	Surrogate Recoveries	Result		Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*130 %*	S-04	*70-130*

Sample and Data Qualifiers Relating to This Work Order

TO-VAC	The final vacuum in the canister was less than -2 inches Hg vacuum. The time integrated sampling may be affected and not reflect proper sampling over the time period. The data user should take note.
TO-LCS-H	The result reported for this compound may be biased high due to its behavior in the analysis batch LCS where it recovered greater than 130% of the expected value.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

York Analytical Laboratories, Inc.
120 Research Drive, Stratford, CT 06615 | 132-02 89th Ave Queens, NY 11418
clientservices@yorklab.com
www.yorklab.com

Field Chain-of-Custody Record - AIR

NOTE: YORK's Standard Terms & Conditions are listed on the back side of this document. This document serves as your written authorization for YORK to proceed with the analyses requested below. Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No. 19C0387

Page _____ of _____

YOUR Information	Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company: Advanced Cleanup Tech	Company: ACT	Company: ACT	9311-BKNY	RUSH - Next Day
Address: 110 Main St. Port Washington, NY	Address: Same	Address: Same	YOUR Project Name	RUSH - Two Day
Phone.: 516-441-5800	Phone.:	Phone.:		RUSH - Three Day
Contact: Tim Yung	Contact: Paul Stewart	Contact: Karen Freeman		RUSH - Four Day
E-mail: Timy@act.earth	E-mail: paul s@act.earth	E-mail: KarenF@act.earth	YOUR PO#:	Standard (5-7 Day) X

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Tim Yung

Samples Collected by: (print your name above and sign below)

Air Matrix Codes
- AI - Indoor Ambient Air
- AO - Outdoor Amb. Air
- AE - Vapor Extraction Well/ Process Gas/Effluent
- AS - Soil Vapor/Sub-Slab

Samples From
- New York
- New Jersey
- Connecticut
- Pennsylvania
- Other

Report / EDD Type (circle selections)

Summary Report	CT RCP	Standard Excel EDD
QA Report	CT RCP DQA/DUE	EQuIS (Standard)
NY ASP A Package	NJDEP Reduced Deliv.	NYSDEC EQuIS
NY ASP B Package	NJDKQP	NJDEP SRP HazSite
Other:		

YORK Reg. Comp.
Compared to the following Regulation(s): (please fill in)

Certified Canisters: Batch ___ Individual ___

Please enter the following REQUIRED Field Data

Reporting Units: ug/m³ ___ ppbv ___ ppmv ___

Sample Identification	Date/Time Sampled	Air Matrix	Canister Vacuum Before Sampling (in Hg)	Canister Vacuum After Sampling (in Hg)	Canister ID	Flow Cont. ID	Analysis Requested
9311-INF	3/11/19 ~1330	AE	-30	-4	18305	N/A	TO-15
9311-EFF	" "	AE	-30	-4	23797	N/A	"

Comments:

Detection Limits Required
≤ 1 ug/m³ ___ NYSDEC V1 Limits ___
Routine Survey ___ Other ___

Sampling Media
6 Liter Canister X
Tedlar Bag

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
T-Y ACT	3/11/19 1640	KBahnyork	3/11/19 1640	KBahnyork	3/12/19 8:50AM
Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time
Queens Secured Room	3/12/19 8:50AM				
Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time
				York	3/12/19 10:10am

Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Report Date: 04/03/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19C1121

Report Date: 04/03/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19C1121

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on March 27, 2019 with a temperature of C. The project was identified as your project: **9311-BKNY**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
19C1121-01	9311-SSDS1	Vapor Extraction	03/26/2019	03/27/2019
19C1121-02	9311-SSDS2	Vapor Extraction	03/26/2019	03/27/2019
19C1121-03	9311-SSDS3	Vapor Extraction	03/26/2019	03/27/2019
19C1121-04	9311-SSDS4	Vapor Extraction	03/26/2019	03/27/2019
19C1121-05	9311-SSDS5	Vapor Extraction	03/26/2019	03/27/2019

General Notes for York Project (SDG) No.: 19C1121

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 04/03/2019

Benjamin Gulizia
Laboratory Director

Sample Information

Client Sample ID: 9311-SSDS1 **York Sample ID:** 19C1121-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:30 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.95	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:			
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.76	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.95	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.1	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.76	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.56	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-35-4	**1,1-Dichloroethylene**	**0.28**		ug/m³	0.14	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	1.0	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
95-63-6	**1,2,4-Trimethylbenzene**	**1.9**		ug/m³	0.68	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.1	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.84	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.56	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.64	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.97	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-67-8	**1,3,5-Trimethylbenzene**	**0.75**		ug/m³	0.68	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
106-99-0	1,3-Butadiene	ND		ug/m³	0.92	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	0.84	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.64	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.84	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
123-91-1	1,4-Dioxane	ND		ug/m³	1.0	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
78-93-3	**2-Butanone**	**3.5**		ug/m³	0.41	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS1 **York Sample ID:** 19C1121-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:30 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.391	EPA TO-15 Certifications:	03/29/2019 09:00	03/29/2019 19:52	AS
107-05-1	3-Chloropropene	ND		ug/m³	2.2	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
108-10-1	**4-Methyl-2-pentanone**	**0.91**		ug/m³	0.57	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
67-64-1	**Acetone**	**9.9**		ug/m³	0.66	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
107-13-1	Acrylonitrile	ND		ug/m³	0.30	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
71-43-2	**Benzene**	**1.6**		ug/m³	0.44	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
100-44-7	Benzyl chloride	ND		ug/m³	0.72	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
75-27-4	Bromodichloromethane	ND		ug/m³	0.93	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
75-25-2	Bromoform	ND		ug/m³	1.4	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
74-83-9	Bromomethane	ND		ug/m³	0.54	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
75-15-0	Carbon disulfide	ND		ug/m³	0.43	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
56-23-5	**Carbon tetrachloride**	**0.70**		ug/m³	0.22	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
108-90-7	Chlorobenzene	ND		ug/m³	0.64	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
75-00-3	Chloroethane	ND		ug/m³	0.37	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
67-66-3	Chloroform	ND		ug/m³	0.68	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
74-87-3	**Chloromethane**	**0.89**		ug/m³	0.29	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
156-59-2	**cis-1,2-Dichloroethylene**	**0.33**		ug/m³	0.14	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.63	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
110-82-7	**Cyclohexane**	**1.5**		ug/m³	0.48	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
124-48-1	Dibromochloromethane	ND		ug/m³	1.2	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
75-71-8	**Dichlorodifluoromethane**	**2.5**		ug/m³	0.69	1.391	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 19:52	AS
141-78-6	*** Ethyl acetate**	**1.6**		ug/m³	1.0	1.391	EPA TO-15 Certifications:	03/29/2019 09:00	03/29/2019 19:52	AS

Sample Information

Client Sample ID: 9311-SSDS1 **York Sample ID:** 19C1121-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:30 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**6.7**		ug/m³	0.60	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.5	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	**Isopropanol**	**1.5**		ug/m³	0.68	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	**Methyl Methacrylate**	**0.80**		ug/m³	0.57	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.50	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	**Methylene chloride**	**1.3**		ug/m³	0.97	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	**n-Heptane**	**1.8**		ug/m³	0.57	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	**n-Hexane**	**4.2**		ug/m³	0.49	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**8.0**		ug/m³	0.60	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**27**		ug/m³	1.2	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	*** p-Ethyltoluene**	**1.6**		ug/m³	0.68	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.24	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.59	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
127-18-4	**Tetrachloroethylene**	**3.2**		ug/m³	0.24	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
109-99-9	*** Tetrahydrofuran**	**1.8**		ug/m³	0.82	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications:			
108-88-3	**Toluene**	**16**		ug/m³	0.52	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.55	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.63	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-01-6	**Trichloroethylene**	**1.3**		ug/m³	0.19	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-69-4	**Trichlorofluoromethane (Freon 11)**	**1.4**		ug/m³	0.78	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-05-4	Vinyl acetate	ND		ug/m³	0.49	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
593-60-2	Vinyl bromide	ND		ug/m³	0.61	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-01-4	**Vinyl Chloride**	**0.11**		ug/m³	0.089	1.391	EPA TO-15	03/29/2019 09:00	03/29/2019 19:52	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-SSDS1 **York Sample ID:** 19C1121-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:30 pm	03/27/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**						
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*80.9 %*		*70-130*						

Sample Information

Client Sample ID: 9311-SSDS2 **York Sample ID:** 19C1121-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:35 pm	03/27/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.93	1.354	EPA TO-15 Certifications:	03/29/2019 09:00	03/29/2019 22:01	AS
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.74	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.93	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.0	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.74	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.55	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.13	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	1.0	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
95-63-6	**1,2,4-Trimethylbenzene**	**1.3**		ug/m³	0.67	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.0	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.81	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.55	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.63	1.354	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/29/2019 22:01	AS

Sample Information

Client Sample ID: 9311-SSDS2 **York Sample ID:** 19C1121-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:35 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.95	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-67-8	1,3,5-Trimethylbenzene	ND		ug/m³	0.67	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
106-99-0	1,3-Butadiene	ND		ug/m³	0.90	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	0.81	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.63	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.81	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
123-91-1	1,4-Dioxane	ND		ug/m³	0.98	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
78-93-3	**2-Butanone**	**3.8**		ug/m³	0.40	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	2.1	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	0.55	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-64-1	**Acetone**	**7.4**		ug/m³	0.64	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
107-13-1	Acrylonitrile	ND		ug/m³	0.29	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
71-43-2	**Benzene**	**0.82**		ug/m³	0.43	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
100-44-7	Benzyl chloride	ND		ug/m³	0.70	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-27-4	Bromodichloromethane	ND		ug/m³	0.91	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-25-2	Bromoform	ND		ug/m³	1.4	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-83-9	Bromomethane	ND		ug/m³	0.53	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-15-0	Carbon disulfide	ND		ug/m³	0.42	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
56-23-5	**Carbon tetrachloride**	**0.43**		ug/m³	0.21	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-90-7	Chlorobenzene	ND		ug/m³	0.62	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-00-3	Chloroethane	ND		ug/m³	0.36	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS2 **York Sample ID:** 19C1121-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:35 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
67-66-3	Chloroform	ND		ug/m³	0.66	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-87-3	**Chloromethane**	**1.0**		ug/m³	0.28	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/m³	0.13	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.61	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-82-7	Cyclohexane	ND		ug/m³	0.47	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
124-48-1	Dibromochloromethane	ND		ug/m³	1.2	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-71-8	**Dichlorodifluoromethane**	**2.2**		ug/m³	0.67	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
141-78-6	* Ethyl acetate	ND		ug/m³	0.98	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
100-41-4	**Ethyl Benzene**	**1.9**		ug/m³	0.59	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.4	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-63-0	**Isopropanol**	**1.3**		ug/m³	0.67	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
80-62-6	**Methyl Methacrylate**	**0.55**		ug/m³	0.55	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.49	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-09-2	**Methylene chloride**	**4.0**		ug/m³	0.94	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
142-82-5	**n-Heptane**	**0.67**		ug/m³	0.55	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-54-3	**n-Hexane**	**0.72**		ug/m³	0.48	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
95-47-6	**o-Xylene**	**3.9**		ug/m³	0.59	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
179601-23-1	**p- & m- Xylenes**	**9.8**		ug/m³	1.2	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
622-96-8	*** p-Ethyltoluene**	**1.1**		ug/m³	0.67	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.23	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.58	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
127-18-4	**Tetrachloroethylene**	**0.46**		ug/m³	0.23	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS2 **York Sample ID:** 19C1121-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:35 pm	03/27/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
109-99-9	* Tetrahydrofuran	ND		ug/m³	0.80	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:			
108-88-3	**Toluene**	**4.1**		ug/m³	0.51	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.54	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.61	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-01-6	Trichloroethylene	ND		ug/m³	0.18	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-69-4	**Trichlorofluoromethane (Freon 11)**	**1.1**		ug/m³	0.76	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-05-4	Vinyl acetate	ND		ug/m³	0.48	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
593-60-2	Vinyl bromide	ND		ug/m³	0.59	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-01-4	Vinyl Chloride	ND		ug/m³	0.087	1.354	EPA TO-15	03/29/2019 09:00	03/29/2019 22:01	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*113 %*	*70-130*

Sample Information

Client Sample ID: 9311-SSDS3 **York Sample ID:** 19C1121-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:38 pm	03/27/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.93	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.74	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.93	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.0	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS3 **York Sample ID:** 19C1121-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:38 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.74	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.55	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.13	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	1.0	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-63-6	**1,2,4-Trimethylbenzene**	**3.1**		ug/m³	0.67	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.0	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.82	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.55	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.63	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.95	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-67-8	**1,3,5-Trimethylbenzene**	**0.93**		ug/m³	0.67	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-99-0	1,3-Butadiene	ND		ug/m³	0.90	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	0.82	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.63	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.82	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
123-91-1	1,4-Dioxane	ND		ug/m³	0.98	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
78-93-3	**2-Butanone**	**5.6**		ug/m³	0.40	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	2.1	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	0.56	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-64-1	**Acetone**	**6.0**		ug/m³	0.65	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-13-1	Acrylonitrile	ND		ug/m³	0.29	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-SSDS3 **York Sample ID:** 19C1121-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:38 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-43-2	**Benzene**	**0.52**		ug/m³	0.43	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
100-44-7	Benzyl chloride	ND		ug/m³	0.70	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-27-4	Bromodichloromethane	ND		ug/m³	0.91	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-25-2	Bromoform	ND		ug/m³	1.4	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-83-9	Bromomethane	ND		ug/m³	0.53	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-15-0	Carbon disulfide	ND		ug/m³	0.42	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
56-23-5	**Carbon tetrachloride**	**0.34**		ug/m³	0.21	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-90-7	Chlorobenzene	ND		ug/m³	0.63	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-00-3	Chloroethane	ND		ug/m³	0.36	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-66-3	Chloroform	ND		ug/m³	0.66	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-87-3	**Chloromethane**	**0.67**		ug/m³	0.28	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-59-2	**cis-1,2-Dichloroethylene**	**0.32**		ug/m³	0.13	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.62	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-82-7	Cyclohexane	ND		ug/m³	0.47	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
124-48-1	Dibromochloromethane	ND		ug/m³	1.2	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-71-8	**Dichlorodifluoromethane**	**1.8**		ug/m³	0.67	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
141-78-6	* Ethyl acetate	ND		ug/m³	0.98	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
100-41-4	**Ethyl Benzene**	**5.8**		ug/m³	0.59	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.4	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-63-0	**Isopropanol**	**1.7**		ug/m³	0.67	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
80-62-6	Methyl Methacrylate	ND		ug/m³	0.56	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.49	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS3 **York Sample ID:** 19C1121-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:38 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-09-2	Methylene chloride	ND		ug/m³	0.94	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	**n-Heptane**	**0.67**		ug/m³	0.56	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	**n-Hexane**	**0.53**		ug/m³	0.48	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**11**		ug/m³	0.59	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**30**		ug/m³	1.2	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	*** p-Ethyltoluene**	**2.1**		ug/m³	0.67	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.23	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.58	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
127-18-4	**Tetrachloroethylene**	**3.3**		ug/m³	0.23	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
109-99-9	*** Tetrahydrofuran**	**2.4**		ug/m³	0.80	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications:			
108-88-3	**Toluene**	**2.9**		ug/m³	0.51	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.54	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.62	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-01-6	**Trichloroethylene**	**0.51**		ug/m³	0.18	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-69-4	**Trichlorofluoromethane (Freon 11)**	**1.1**		ug/m³	0.76	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-05-4	Vinyl acetate	ND		ug/m³	0.48	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
593-60-2	Vinyl bromide	ND		ug/m³	0.59	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-01-4	Vinyl Chloride	ND		ug/m³	0.087	1.358	EPA TO-15	03/29/2019 09:00	03/29/2019 23:06	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*88.9 %*	*70-130*

Sample Information

Client Sample ID: 9311-SSDS4 **York Sample ID:** 19C1121-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:40 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	2.1	3.022	EPA TO-15 Certifications:	03/29/2019 09:00	03/30/2019 00:11	AS
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	1.6	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	2.1	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	2.3	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	1.6	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
75-34-3	1,1-Dichloroethane	ND		ug/m³	1.2	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.30	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	2.2	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
95-63-6	**1,2,4-Trimethylbenzene**	**22**		ug/m³	1.5	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
106-93-4	1,2-Dibromoethane	ND		ug/m³	2.3	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	1.8	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
107-06-2	1,2-Dichloroethane	ND		ug/m³	1.2	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
78-87-5	1,2-Dichloropropane	ND		ug/m³	1.4	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	2.1	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
108-67-8	**1,3,5-Trimethylbenzene**	**7.0**		ug/m³	1.5	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
106-99-0	1,3-Butadiene	ND		ug/m³	2.0	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	1.8	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	1.4	3.022	EPA TO-15 Certifications:	03/29/2019 09:00	03/30/2019 00:11	AS
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	1.8	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
123-91-1	1,4-Dioxane	ND		ug/m³	2.2	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
78-93-3	**2-Butanone**	**58**		ug/m³	0.89	3.022	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 00:11	AS
591-78-6	* **2-Hexanone**	**3.2**		ug/m³	2.5	3.022	EPA TO-15 Certifications:	03/29/2019 09:00	03/30/2019 00:11	AS

Sample Information

Client Sample ID: 9311-SSDS4 **York Sample ID:** 19C1121-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:40 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
107-05-1	3-Chloropropene	ND		ug/m³	4.7	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-10-1	**4-Methyl-2-pentanone**	**4.6**		ug/m³	1.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-64-1	**Acetone**	**90**		ug/m³	1.4	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
107-13-1	Acrylonitrile	ND		ug/m³	0.66	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
71-43-2	**Benzene**	**2.2**		ug/m³	0.97	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
100-44-7	Benzyl chloride	ND		ug/m³	1.6	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-27-4	Bromodichloromethane	ND		ug/m³	2.0	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-25-2	Bromoform	ND		ug/m³	3.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-83-9	Bromomethane	ND		ug/m³	1.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-15-0	Carbon disulfide	ND		ug/m³	0.94	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
56-23-5	**Carbon tetrachloride**	**0.95**		ug/m³	0.48	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-90-7	Chlorobenzene	ND		ug/m³	1.4	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-00-3	Chloroethane	ND		ug/m³	0.80	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-66-3	Chloroform	ND		ug/m³	1.5	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-87-3	**Chloromethane**	**2.0**		ug/m³	0.62	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/m³	0.30	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	1.4	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-82-7	**Cyclohexane**	**2.7**		ug/m³	1.0	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
124-48-1	Dibromochloromethane	ND		ug/m³	2.6	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-71-8	**Dichlorodifluoromethane**	**4.5**		ug/m³	1.5	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
141-78-6	*** Ethyl acetate**	**5.9**		ug/m³	2.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:			
100-41-4	**Ethyl Benzene**	**130**		ug/m³	1.3	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS4 **York Sample ID:** 19C1121-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:40 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND		ug/m³	3.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-63-0	**Isopropanol**	**6.1**		ug/m³	1.5	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
80-62-6	Methyl Methacrylate	ND		ug/m³	1.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	1.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-09-2	Methylene chloride	ND		ug/m³	2.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
142-82-5	**n-Heptane**	**7.7**		ug/m³	1.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
110-54-3	**n-Hexane**	**4.6**		ug/m³	1.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
95-47-6	**o-Xylene**	**170**		ug/m³	1.3	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
179601-23-1	**p- & m- Xylenes**	**480**		ug/m³	2.6	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
622-96-8	*** p-Ethyltoluene**	**19**		ug/m³	1.5	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.52	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	1.3	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
127-18-4	**Tetrachloroethylene**	**4.3**		ug/m³	0.51	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
109-99-9	*** Tetrahydrofuran**	**2.0**		ug/m³	1.8	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:			
108-88-3	**Toluene**	**28**		ug/m³	1.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	1.2	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	1.4	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-01-6	**Trichloroethylene**	**0.97**		ug/m³	0.41	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-69-4	**Trichlorofluoromethane (Freon 11)**	**2.5**		ug/m³	1.7	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-05-4	Vinyl acetate	ND		ug/m³	1.1	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
593-60-2	Vinyl bromide	ND		ug/m³	1.3	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-01-4	Vinyl Chloride	ND		ug/m³	0.19	3.022	EPA TO-15	03/29/2019 09:00	03/30/2019 00:11	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Surrogate Recoveries	Result	Acceptance Range

Sample Information

Client Sample ID: 9311-SSDS4 **York Sample ID:** 19C1121-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:40 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*95.3 %*			*70-130*					

Sample Information

Client Sample ID: 9311-SSDS5 **York Sample ID:** 19C1121-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:50 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.95	1.386	EPA TO-15 Certifications:	03/29/2019 09:00	03/30/2019 01:16	AS
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.76	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.95	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.1	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.76	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.56	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.14	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	1.0	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
95-63-6	**1,2,4-Trimethylbenzene**	**1.6**		ug/m³	0.68	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.1	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.83	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.56	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.64	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.97	1.386	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	03/29/2019 09:00	03/30/2019 01:16	AS

Sample Information

Client Sample ID: 9311-SSDS5 **York Sample ID:** 19C1121-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:50 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-67-8	1,3,5-Trimethylbenzene	ND		ug/m³	0.68	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
106-99-0	1,3-Butadiene	ND		ug/m³	0.92	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	0.83	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.64	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.83	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
123-91-1	1,4-Dioxane	ND		ug/m³	1.0	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
78-93-3	**2-Butanone**	**2.0**		ug/m³	0.41	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	2.2	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-10-1	**4-Methyl-2-pentanone**	**0.74**		ug/m³	0.57	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-64-1	**Acetone**	**7.0**		ug/m³	0.66	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
107-13-1	Acrylonitrile	ND		ug/m³	0.30	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
71-43-2	**Benzene**	**0.93**		ug/m³	0.44	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
100-44-7	Benzyl chloride	ND		ug/m³	0.72	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-27-4	Bromodichloromethane	ND		ug/m³	0.93	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-25-2	Bromoform	ND		ug/m³	1.4	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
74-83-9	Bromomethane	ND		ug/m³	0.54	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-15-0	Carbon disulfide	ND		ug/m³	0.43	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
56-23-5	**Carbon tetrachloride**	**0.44**		ug/m³	0.22	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-90-7	Chlorobenzene	ND		ug/m³	0.64	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-00-3	Chloroethane	ND		ug/m³	0.37	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
67-66-3	Chloroform	ND		ug/m³	0.68	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

Sample Information

Client Sample ID: 9311-SSDS5 **York Sample ID:** 19C1121-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:50 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-87-3	**Chloromethane**	**1.4**		ug/m³	0.29	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-59-2	cis-1,2-Dichloroethylene	ND		ug/m³	0.14	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.63	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-82-7	Cyclohexane	ND		ug/m³	0.48	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
124-48-1	Dibromochloromethane	ND		ug/m³	1.2	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-71-8	**Dichlorodifluoromethane**	**2.4**		ug/m³	0.69	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
141-78-6	* Ethyl acetate	ND		ug/m³	1.0	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			
100-41-4	**Ethyl Benzene**	**2.2**		ug/m³	0.60	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.5	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	**Isopropanol**	**1.4**		ug/m³	0.68	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	Methyl Methacrylate	ND		ug/m³	0.57	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.50	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	**Methylene chloride**	**1.7**		ug/m³	0.96	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	**n-Heptane**	**0.57**		ug/m³	0.57	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	**n-Hexane**	**0.73**		ug/m³	0.49	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**3.2**		ug/m³	0.60	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**9.0**		ug/m³	1.2	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	* **p-Ethyltoluene**	**1.3**		ug/m³	0.68	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.24	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.59	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
127-18-4	Tetrachloroethylene	ND		ug/m³	0.24	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
109-99-9	* Tetrahydrofuran	ND		ug/m³	0.82	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:			

Sample Information

Client Sample ID: 9311-SSDS5 **York Sample ID:** 19C1121-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19C1121	9311-BKNY	Vapor Extraction	March 26, 2019 12:50 pm	03/27/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-88-3	**Toluene**	**4.3**		ug/m³	0.52	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.55	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.63	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-01-6	Trichloroethylene	ND		ug/m³	0.19	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-69-4	**Trichlorofluoromethane (Freon 11)**	**1.3**		ug/m³	0.78	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-05-4	Vinyl acetate	ND		ug/m³	0.49	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
593-60-2	Vinyl bromide	ND		ug/m³	0.61	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-01-4	Vinyl Chloride	ND		ug/m³	0.089	1.386	EPA TO-15	03/29/2019 09:00	03/30/2019 01:16	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*84.0 %*	*70-130*

Sample and Data Qualifiers Relating to This Work Order

TO-VAC — The final vacuum in the canister was less than -2 inches Hg vacuum. The time integrated sampling may be affected and not reflect proper sampling over the time period. The data user should take note.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Report Date: 05/06/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19E0001

Report Date: 05/06/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19E0001

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 01, 2019 with a temperature of 1.8 C. The project was identified as your project: **9311-BKNY**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
19E0001-01	MS-Drum	Water	04/30/2019	05/01/2019

General Notes for York Project (SDG) No.: 19E0001

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 05/06/2019

Benjamin Gulizia
Laboratory Director

Sample Information

Client Sample ID: **MS-Drum** **York Sample ID:** **19E0001-01**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0001	9311-BKNY	Water	April 30, 2019 12:50 pm	05/01/2019

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
106-93-4	1,2-Dibromoethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
78-87-5	1,2-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
78-93-3	**2-Butanone**	**2.0**	CCV-E	ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		

Sample Information

Client Sample ID: **MS-Drum** **York Sample ID:** **19E0001-01**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0001	9311-BKNY	Water	April 30, 2019 12:50 pm	05/01/2019

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	2-Hexanone	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
108-10-1	4-Methyl-2-pentanone	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
67-64-1	**Acetone**	**2.3**	CCV-E	ug/L	1.0	2.0	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
107-02-8	Acrolein	ND		ug/L	0.20	2.0	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
107-13-1	Acrylonitrile	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
74-97-5	Bromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
75-27-4	Bromodichloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-25-2	Bromoform	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
74-83-9	Bromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-15-0	Carbon disulfide	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
108-90-7	Chlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-00-3	Chloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
67-66-3	Chloroform	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
74-87-3	Chloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
110-82-7	Cyclohexane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
124-48-1	Dibromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
74-95-3	Dibromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		

Sample Information

Client Sample ID: **MS-Drum** **York Sample ID:** **19E0001-01**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0001	9311-BKNY	Water	April 30, 2019 12:50 pm	05/01/2019

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
100-41-4	Ethyl Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
87-68-3	Hexachlorobutadiene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
79-20-9	Methyl acetate	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
108-87-2	Methylcyclohexane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
75-09-2	Methylene chloride	ND		ug/L	1.0	2.0	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
95-47-6	o-Xylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
179601-23-1	p- & m- Xylenes	ND		ug/L	0.50	1.0	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
99-87-6	p-Isopropyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
100-42-5	Styrene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-65-0	tert-Butyl alcohol (TBA)	ND		ug/L	0.50	2.5	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	NELAC-NY10854,NELAC-NY12058,PADEP,NJI		
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
108-88-3	**Toluene**	**0.36**	J	ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
79-01-6	**Trichloroethylene**	**0.22**	J	ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		

Sample Information

Client Sample ID: MS-Drum **York Sample ID:** 19E0001-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0001	9311-BKNY	Water	April 30, 2019 12:50 pm	05/01/2019

Volatile Organics, NJDEP/TCL/Part 375 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-69-4	Trichlorofluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,PA		
1330-20-7	Xylenes, Total	ND		ug/L	0.60	1.5	1	EPA 8260C	05/03/2019 07:30	05/03/2019 12:58	SS
								Certifications:	CTDOH,NELAC-NY10854,NELAC-NY12058,NJ		

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*105 %*	*69-130*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*103 %*	*81-117*
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*113 %*	*79-122*

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
19E0001-01	MS-Drum	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Sample and Data Qualifiers Relating to This Work Order

QR-04	The RPD exceeded control limits for the LCS/LCSD QC.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
CCV-E	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

York Analytical Laboratories, Inc.
120 Research Drive, Stratford, CT 06615
132-02 89th Ave, Queens, NY 11418
clientservices@yorklab.com
www.yorklab.com

Field Chain-of-Custody Record

NOTE: YORK's Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No. 19E0001

Page ____ of ____

YOUR Information	Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company: Advanced Cleanup Tech	Company: ACT	Company: ACT	9311-BKNY	RUSH - Next Day
Address: 110 Main St. Port Washington, NY	Address: SAME	Address: SAME	YOUR Project Name	RUSH - Two Day
Phone.: 516-441-5800	Phone.:	Phone.:		RUSH - Three Day
Contact: Tim Yung	Contact: Paul Stewart	Contact: Karen Friedman		RUSH - Four Day
E-mail: timy@act-earth	E-mail: paulS@act-earth	E-mail: KarenF@act-earth	YOUR PO#:	Standard (5-7 Day) X

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Tim Yung

Samples Collected by: (print your name above and sign below)

T-Y

Matrix Codes	Samples From	Report / EDD Type (circle selections)			YORK Reg. Comp.
S - soil / solid	New York X	Summary Report	CT RCP	Standard Excel EDD	Compared to the following Regulation(s): (please fill in)
GW - groundwater	New Jersey	QA Report	CT RCP DQA/DUE	EQuIS (Standard)	NYSDEC TOGS (6A)
DW - drinking water	Connecticut	NY ASP A Package	NJDEP Reduced Deliverables	NYSDEC EQuIS	
WW - wastewater	Pennsylvania	NY ASP B Package		NJDEP SRP HazSite	
O - Oil (Other)	Other		NJDKQP	Other:	

Sample Identification	Sample Matrix	Date/Time Sampled	Analysis Requested	Container Description
MS-DRUM	other - drum water sample	4/30/19 1250	VOC's	3 VOA's w/ HCL

Comments:

Preservation: (check all that apply)
HCl X MeOH ___ HNO_3 ___ H_2SO_4 ___ NaOH ___ ZnAc ___
Ascorbic Acid ___ Other: ___

Special Instruction
Field Filtered ____
Lab to Filter ____

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
T-Y ACT	5/1/19 0900	KBakerwork	5/1/19 0900	KBakerwork	5-1-19 1654
Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time
Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time / Temp. Received at Lab
				TC Yarbrough	5/1/19 1654 / 1.8 Degrees C

Technical Report

prepared for:

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Report Date: 05/08/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19E0044

Report Date: 05/08/2019
Client Project ID: 9311-BKNY
York Project (SDG) No.: 19E0044

Advanced Cleanup Technologies, Inc.
110 Main Street
Port Washington NY, 11050
Attention: Paul Stewart

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 02, 2019 with a temperature of C. The project was identified as your project: **9311-BKNY**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
19E0044-01	9311-INF	Vapor Extraction	04/30/2019	05/02/2019
19E0044-02	9311-EFF	Vapor Extraction	04/30/2019	05/02/2019

General Notes for York Project (SDG) No.: 19E0044

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 05/08/2019

Benjamin Gulizia
Laboratory Director

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19E0044-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:05 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	1.9	2.812	EPA TO-15 Certifications:	05/07/2019 09:00	05/07/2019 21:56	AS
71-55-6	**1,1,1-Trichloroethane**	**17**		ug/m³	1.5	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	1.9	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	2.2	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	1.5	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-34-3	**1,1-Dichloroethane**	**2.2**		ug/m³	1.1	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-35-4	**1,1-Dichloroethylene**	**12**		ug/m³	0.28	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	2.1	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
95-63-6	**1,2,4-Trimethylbenzene**	**2.5**		ug/m³	1.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
106-93-4	1,2-Dibromoethane	ND		ug/m³	2.2	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	1.7	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
107-06-2	1,2-Dichloroethane	ND		ug/m³	1.1	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
78-87-5	1,2-Dichloropropane	ND		ug/m³	1.3	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	2.0	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
108-67-8	1,3,5-Trimethylbenzene	ND		ug/m³	1.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
106-99-0	1,3-Butadiene	ND		ug/m³	1.9	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	1.7	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	1.3	2.812	EPA TO-15 Certifications:	05/07/2019 09:00	05/07/2019 21:56	AS
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	1.7	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
123-91-1	1,4-Dioxane	ND		ug/m³	2.0	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
78-93-3	**2-Butanone**	**3.2**		ug/m³	0.83	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19E0044-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:05 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
591-78-6	* 2-Hexanone	ND		ug/m³	2.3	2.812	EPA TO-15 Certifications:	05/07/2019 09:00	05/07/2019 21:56	AS
107-05-1	3-Chloropropene	ND		ug/m³	4.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	1.2	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
67-64-1	**Acetone**	**3.5**		ug/m³	1.3	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
107-13-1	Acrylonitrile	ND		ug/m³	0.61	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
71-43-2	**Benzene**	**4.1**		ug/m³	0.90	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
100-44-7	Benzyl chloride	ND		ug/m³	1.5	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-27-4	Bromodichloromethane	ND		ug/m³	1.9	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-25-2	Bromoform	ND		ug/m³	2.9	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
74-83-9	Bromomethane	ND		ug/m³	1.1	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-15-0	**Carbon disulfide**	**4.6**		ug/m³	0.88	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
56-23-5	**Carbon tetrachloride**	**0.71**		ug/m³	0.44	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
108-90-7	Chlorobenzene	ND		ug/m³	1.3	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-00-3	Chloroethane	ND		ug/m³	0.74	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
67-66-3	**Chloroform**	**51**		ug/m³	1.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
74-87-3	Chloromethane	ND		ug/m³	0.58	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
156-59-2	**cis-1,2-Dichloroethylene**	**15**		ug/m³	0.28	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	1.3	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
110-82-7	**Cyclohexane**	**0.97**		ug/m³	0.97	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
124-48-1	Dibromochloromethane	ND		ug/m³	2.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
75-71-8	**Dichlorodifluoromethane**	**2.8**	TO-LC S-H	ug/m³	1.4	2.812	EPA TO-15 Certifications: NELAC-NY12058,NJDEP-Queens	05/07/2019 09:00	05/07/2019 21:56	AS
141-78-6	* Ethyl acetate	ND		ug/m³	2.0	2.812	EPA TO-15 Certifications:	05/07/2019 09:00	05/07/2019 21:56	AS

Sample Information

Client Sample ID: 9311-INF

York Sample ID: 19E0044-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:05 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-41-4	**Ethyl Benzene**	**2.7**		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	3.0	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	Isopropanol	ND		ug/m³	1.4	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	Methyl Methacrylate	ND		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	1.0	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	Methylene chloride	ND		ug/m³	2.0	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	**n-Heptane**	**1.7**		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	**n-Hexane**	**2.0**		ug/m³	0.99	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**2.3**		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**12**		ug/m³	2.4	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	*** p-Ethyltoluene**	**3.0**		ug/m³	1.4	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.48	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
127-18-4	**Tetrachloroethylene**	**550**		ug/m³	0.48	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
109-99-9	*** Tetrahydrofuran**	**4.9**		ug/m³	1.7	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications:			
108-88-3	**Toluene**	**19**		ug/m³	1.1	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	1.1	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	1.3	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-01-6	**Trichloroethylene**	**450**		ug/m³	0.38	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-69-4	**Trichlorofluoromethane (Freon 11)**	**3.2**		ug/m³	1.6	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-05-4	Vinyl acetate	ND		ug/m³	0.99	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
593-60-2	Vinyl bromide	ND		ug/m³	1.2	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-INF **York Sample ID:** 19E0044-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:05 pm	05/02/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND		ug/m³	0.18	2.812	EPA TO-15	05/07/2019 09:00	05/07/2019 21:56	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*94.2 %*	*70-130*

Sample Information

Client Sample ID: 9311-EFF **York Sample ID:** 19E0044-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:10 pm	05/02/2019

Volatile Organics, EPA TO15 Full List **Log-in Notes:** **Sample Notes:** TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	* 1,1,1,2-Tetrachloroethane	ND		ug/m³	0.92	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
71-55-6	1,1,1-Trichloroethane	ND		ug/m³	0.73	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/m³	0.92	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/m³	1.0	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
79-00-5	1,1,2-Trichloroethane	ND		ug/m³	0.73	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-34-3	1,1-Dichloroethane	ND		ug/m³	0.54	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-35-4	1,1-Dichloroethylene	ND		ug/m³	0.13	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
120-82-1	1,2,4-Trichlorobenzene	ND		ug/m³	0.99	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-63-6	**1,2,4-Trimethylbenzene**	**7.3**		ug/m³	0.66	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-93-4	1,2-Dibromoethane	ND		ug/m³	1.0	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-50-1	1,2-Dichlorobenzene	ND		ug/m³	0.80	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-06-2	1,2-Dichloroethane	ND		ug/m³	0.54	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF

York Sample ID: 19E0044-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:10 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
78-87-5	1,2-Dichloropropane	ND		ug/m³	0.62	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
76-14-2	1,2-Dichlorotetrafluoroethane	ND		ug/m³	0.93	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-67-8	**1,3,5-Trimethylbenzene**	**1.5**		ug/m³	0.66	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
106-99-0	1,3-Butadiene	ND		ug/m³	0.88	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
541-73-1	1,3-Dichlorobenzene	ND		ug/m³	0.80	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-28-9	* 1,3-Dichloropropane	ND		ug/m³	0.62	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
106-46-7	1,4-Dichlorobenzene	ND		ug/m³	0.80	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
123-91-1	1,4-Dioxane	ND		ug/m³	0.96	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
78-93-3	**2-Butanone**	**2.3**		ug/m³	0.39	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
591-78-6	* 2-Hexanone	ND		ug/m³	1.1	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
107-05-1	3-Chloropropene	ND		ug/m³	2.1	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-10-1	4-Methyl-2-pentanone	ND		ug/m³	0.55	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-64-1	**Acetone**	**5.0**		ug/m³	0.63	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
107-13-1	Acrylonitrile	ND		ug/m³	0.29	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
71-43-2	**Benzene**	**5.7**		ug/m³	0.43	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
100-44-7	Benzyl chloride	ND		ug/m³	0.69	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-27-4	Bromodichloromethane	ND		ug/m³	0.89	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-25-2	Bromoform	ND		ug/m³	1.4	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
74-83-9	Bromomethane	ND		ug/m³	0.52	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-15-0	**Carbon disulfide**	**0.66**		ug/m³	0.42	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
56-23-5	Carbon tetrachloride	ND		ug/m³	0.21	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
108-90-7	Chlorobenzene	ND		ug/m³	0.61	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF

York Sample ID: 19E0044-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:10 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-00-3	Chloroethane	ND		ug/m³	0.35	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-66-3	Chloroform	ND		ug/m³	0.65	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
74-87-3	**Chloromethane**	**0.66**		ug/m³	0.28	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
156-59-2	cis-1,2-Dichloroethylene	ND		ug/m³	0.13	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/m³	0.61	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-82-7	**Cyclohexane**	**0.69**		ug/m³	0.46	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
124-48-1	Dibromochloromethane	ND		ug/m³	1.1	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-71-8	**Dichlorodifluoromethane**	**1.9**	TO-LC S-H	ug/m³	0.66	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
141-78-6	* Ethyl acetate	ND		ug/m³	0.96	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
100-41-4	**Ethyl Benzene**	**6.0**		ug/m³	0.58	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
87-68-3	Hexachlorobutadiene	ND		ug/m³	1.4	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
67-63-0	**Isopropanol**	**0.98**		ug/m³	0.66	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
80-62-6	Methyl Methacrylate	ND		ug/m³	0.55	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/m³	0.48	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
75-09-2	**Methylene chloride**	**4.0**		ug/m³	0.93	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
142-82-5	**n-Heptane**	**2.5**		ug/m³	0.55	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
110-54-3	**n-Hexane**	**4.2**		ug/m³	0.47	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
95-47-6	**o-Xylene**	**6.7**		ug/m³	0.58	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
179601-23-1	**p- & m- Xylenes**	**28**		ug/m³	1.2	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			
622-96-8	* **p-Ethyltoluene**	**7.8**		ug/m³	0.66	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
115-07-1	* Propylene	ND		ug/m³	0.23	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
100-42-5	Styrene	ND		ug/m³	0.57	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications: NELAC-NY12058,NJDEP-Queens			

Sample Information

Client Sample ID: 9311-EFF **York Sample ID:** 19E0044-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
19E0044	9311-BKNY	Vapor Extraction	April 30, 2019 1:10 pm	05/02/2019

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes: TO-VAC

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
127-18-4	**Tetrachloroethylene**	**1.4**		ug/m³	0.23	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
109-99-9	*** Tetrahydrofuran**	**4.0**		ug/m³	0.79	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:			
108-88-3	**Toluene**	**33**		ug/m³	0.50	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
156-60-5	trans-1,2-Dichloroethylene	ND		ug/m³	0.53	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/m³	0.61	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
79-01-6	**Trichloroethylene**	**0.79**		ug/m³	0.18	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-69-4	Trichlorofluoromethane (Freon 11)	ND		ug/m³	0.75	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
108-05-4	Vinyl acetate	ND		ug/m³	0.47	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
593-60-2	Vinyl bromide	ND		ug/m³	0.58	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		
75-01-4	Vinyl Chloride	ND		ug/m³	0.085	1.333	EPA TO-15	05/07/2019 09:00	05/07/2019 23:02	AS
							Certifications:	NELAC-NY12058,NJDEP-Queens		

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*90.3 %*	*70-130*

Sample and Data Qualifiers Relating to This Work Order

TO-VAC The final vacuum in the canister was less than -2 inches Hg vacuum. The time integrated sampling may be affected and not reflect proper sampling over the time period. The data user should take note.

TO-LCS-H The result reported for this compound may be biased high due to its behavior in the analysis batch LCS where it recovered greater than 130% of the expected value.

Definitions and Other Explanations

* Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.

ND NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)

RL REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.

LOQ LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.

LOD LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.

MDL METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.

Reported to This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.

NR Not reported

RPD Relative Percent Difference

Wet The data has been reported on an as-received (wet weight) basis

Low Bias Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

High Bias High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

Non-Dir. Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

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Field Chain-of-Custody Record - AIR

NOTE: YORK's Standard Terms & Conditions are listed on the back side of this document. This document serves as your written authorization for YORK to proceed with the analyses requested below. Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No. 19E0044

Page ____ of ____

YOUR Information	Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company: Advanced Cleanup Tech.	Company: ACT	Company: ACT	9311-BKNY	RUSH - Next Day
Address: 110 Main St. Port Washington, NY	Address: 110 Main St	Address: SAME	YOUR Project Name	RUSH - Two Day
Phone.: 516-441-5800	Phone.: SAME	Phone.:		RUSH - Three Day
Contact: Timy@act.earth	Contact: Paul Stewart	Contact: Karen Friedman		RUSH - Four Day
E-mail: Tim Yang	E-mail: Paul@act.earth	E-mail: KarenF@act.earth	YOUR PO#:	Standard (5-7 Day) X

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Tim Yang

Samples Collected by: (print your name above and sign below)

T-Y

Air Matrix Codes	Samples From		Report / EDD Type (circle selections)			YORK Reg. Comp.
AI - Indoor Ambient Air	New York	X	Summary Report	CT RCP	Standard Excel EDD	Compared to the following Regulation(s): (please fill in)
AO - Outdoor Amb. Air	New Jersey		QA Report	CT RCP DQA/DUE	EQuIS (Standard)	
AE - Vapor Extraction Well/ Process Gas/Effluent	Connecticut		NY ASP A Package	NJDEP Reduced Deliv.	NYSDEC EQuIS	
AS - Soil Vapor/Sub-Slab	Pennsylvania		NY ASP B Package	NJDKQP	NJDEP SRP HazSite	
	Other		Other:			

Certified Canisters: Batch ___ Individual ___

Please enter the following REQUIRED Field Data

Reporting Units: ug/m³ ___ ppbv ___ ppmv ___

Sample Identification	Date/Time Sampled	Air Matrix	Canister Vacuum Before Sampling (in Hg)	Canister Vacuum After Sampling (in Hg)	Canister ID	Flow Cont. ID	Analysis Requested
9311-INF	4/30/19 1305	AE	-30	-4	24115	N/A	TO-15
9311-EFF	" 1310	AE	-30	-4	17353	N/A	TO-15

Comments: No FLOW CONT. — grab sample

Detection Limits Required

≤ 1 ug/m³ ____ NYSDEC V1 Limits ____

Routine Survey ____ Other ____

Sampling Media

6 Liter Canister X

Tedlar Bag

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
T-Y ACT	5/1/19 9AM	KBahnyak	5-1-19 9AM	KBahnyak	5/1/19 750AM
Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time
Queens Secured Loom	5/2/19 750AM		5/2/19 0930		
Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time
					5/2/19 0930