FORMER ZOE CHEMICAL SITE

1801 FALMOUTH AVENUE

NEW HYDE PARK, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 130211

Prepared for:

Seaboard Estates, Inc.
c/o Beveridge & Diamond, LLC
477 Madison Avenue, 15th Floor
New York, NY 10022-5802

and

New York State Department of Environmental Conservation
Division of Environmental Remediation
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Prepared by:

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

October 2022; Revised May 2023; Revised June 2024

CERTIFICATION STATEMENT

I Jason Cooper, certify that I am currently a 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).

Jason T. Cooper QEP

6/21/2024 DATE

1801 Falmouth Avenue

New Hyde Park, New York

SITE MANAGEMENT PLAN

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List of Acronyms

ASP	Analytical Services Protocol
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
COC	Certificate of Completion
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval 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
OSHA	Occupational Safety and Health Administration
P.E. or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSO	Remedial System Optimization
SC	Site Characterization
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
TCL	Target Compound List
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank

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: 130211 - 1801 Falmouth Avenue, New Hyde Park NY

Institutional Controls:	1. The property may be used for commercial and industrial use;
	2. Environmental Easement
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.
Engineering Controls:	1. Cover system
	2. Soil Vapor Extraction System
Inspections:	Frequency
1. Cover inspection	Annually
2. Active Soil Vapor Extraction System	Quarterly
Monitoring:	
1. Soil Vapor Extraction System Shutdowns	As needed
2. Soil Vapor Extraction System Sampling	Quarterly
3. Soil Vapor Extraction System Measurement Collection	Quarterly
Maintenance:	
1. Cover system	As needed
2. Soil Vapor Extraction System	As needed
Reporting:	
1. Quarterly Monitoring Reports for the Soil Vapor Extraction System	Quarterly
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 Former Zoe Chemical located at 1801 Falmouth Avenue in New Hyde Park, New York (hereinafter referred to as the "Site") See Figure 1. The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program), Site No. 130211, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

Seaboard Estates, Inc. entered into an Order on Consent, in December 2012 with the NYSDEC to remediate the Site. A figure showing the site location and boundaries of this site is 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 Nassau 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, 6 NYCRR Part 375 and the Order on Consent, (Index # W1-1165-12-06; Site #130211) 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 CA RICH Geology Services, D.P.C., on behalf of Seaboard Estates, Inc., in accordance with the requirements of the NYSDEC's DER- 10 ("Technical Guidance for Site Investigation and Remediation"), dated June, 2010 (revised April 9, 2019), 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. The NYSDEC can also make changes to the SMP or request revisions from the

remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown 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 project manager 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:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent, 6 NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. 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.

5. Notice within 48 hours of any non-routine maintenance activities.

6. 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.

7. 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:

1. 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 Order on Consent, and all approved work plans and reports, including this SMP.

2. 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 notifications. 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**
Brian Jankauskas, NYSDEC Project Manager	(518) 402-9626 brian.jankauskas@dec.ny.gov
John Swartwout, NYSDEC Project Manager's Supervisor	john.swartwout@dec.ny.gov
Mark Sergott, NYSDOH Project Manager	(518) 402-7860 mark.sergott@health.ny.gov
Jason Cooper, CA RICH QEP/PG	(516)576-8844 jcooper@carichinc.com
Ravi Korlipara, PE, Remedial Engineer	(631)965-0181 korlipara@juno.com

* 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 New Hyde Park, Nassau County, New York and is identified as Section 8 Block 189 and Lots 1 through 12 and 42 through 73 on the Nassau County Tax Map (see Figure 3). The site is an approximately two-acre area and is bounded by a wellfield for the Water Authority of Western Nassau County as well as athletic fields for Michael J. Tully Park to the north, Falmouth Avenue to the south, commercial buildings followed by Denton Avenue to the east, and Gould Street to the west (see Figure 3 – Site Layout Map). The boundaries of the site are more fully described in Appendix A – Environmental Easement. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

Seaboard Estates Inc.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of a one-story masonry structure and a parking area. The Site is zoned industrial and is currently utilized for commercial uses. Site occupants include a commercial lumber yard that sells building materials to the general public.

The properties adjoining the Site and, in the neighborhood surrounding the Site, primarily include commercial and industrial properties. The properties immediately south of the Site include commercial and industrial properties; the properties immediately north of the Site include athletic fields; the properties immediately east of the Site include commercial properties; and the properties to the west of the Site include a water recharge basin and beyond that the New Hyde Park Memorial High School.

2.2.2 Geology

The Site geology consists primarily of tan medium grain sand from 0 to approximately 20 feet below ground surface (bgs). This was identified as fill material during Site investigations and when large tree trunks were uncovered during Site activities. Light brown medium grain sand with fine gravel underlies the fill material.

2.2.3 Hydrogeology

Groundwater is approximately 25 feet bgs and flows to the southwest. A perched zone was identified at approximately 14 feet bgs. A groundwater contour map is shown in Figure 4. Groundwater elevation data is provided in Table 1. Groundwater monitoring well construction logs are provided in Appendix C.

2.3 Investigation and Remedial History

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.

Previous operations at the Site were performed by Zoe Chemical Co., which handled chemicals (1,1,1-trichloroethane, ammonia, tetrachloroethene, cleaners, pesticides, etc.) as part of blending and packaging cleaning products, and by CDC Products, which manufactured deodorizing cakes for urinals. Chemicals were stored inside and outside of the building. The current property owner initiated investigations in March 2013. Between July 2013 and September 2016, three Interim Remedial Measures (IRMs) were performed to remove contamination within the storm drains and to install a soil vapor extraction system.

All Investigations are detailed in the Remedial Investigation Report / Feasibility Study dated March 2021, and are listed below:

1) CA RICH Consultants, Inc., Site Characterization Work Plan, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, January 2013.

2) CA RICH Consultants, Inc., Site Characterization Report, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, July 2014.

3) CA RICH Consultants, Inc., Interim Remedial Measures Work Plan, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, January 2015.

4) CA RICH Consultants, Inc., Construction Completion Report – Part A, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, February 2016.

5) CA RICH Consultants, Inc., Construction Completion Report – Part B, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, June 2017.

6) CA RICH Consultants, Inc., Remedial Investigation Work Plan, Former Zoe Chemical, 1801 Falmouth Ave., New Hyde Park, NY, May 2018.

The summary of the RI/FS is as follows:

- All of the Site's permanent groundwater wells (a total of four) and one temporary downgradient groundwater point were sampled and analyzed for Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), pesticides, PCBs, metals, 1,4 dioxane, and perfluorinated chemicals. The results indicate that no VOCs, SVOCs, 1,4-dioxane, or PCBs were identified exceeding their guidelines. The pesticide alpha chlordane was detected in MW-1 (0.097 ug/L) at a concentration slightly exceeding its TOGS standard (0.05 ug/L). The metals sodium and manganese were detected exceeding their TOGS standard in many of the samples; however, these metals are naturally occurring and are not expected to have a negative impact on the Property. There is no basis to conclude that these naturally occurring metals are indicative of a spill or release, and therefore do not require remedial activities. PFOA and PFOS concentrations exceeded their individual NYSDOH Drinking Water Standard (10 ng/L) in many of the groundwater samples. However, when the PFOA and PFOS concentrations are combined, the only samples that exceeded the EPA guideline (70 ng/L) were MW-1 (179.11 ng/L), MW-3 (102.5 ng/L), and MW-XX (72.93 ng/L) the duplicate of MW-2. The highest exceedance was identified in MW-1 which is the Site's upgradient monitoring well. Downgradient wells MW-4 (37.4 ng/L) and GW-1 (66.5 ng/L) identified much lower concentrations of PFOA and PFOS concentrations.

- A re-evaluation of the remaining on-site soil quality was performed based on the results of CA RICH's 2013 Site Characterization Investigation which identified pesticides/metals exceeding their commercial use SCOs in three Site Characterization samples (SB-1, SB-5, and SGB-1) and four Construction Completion Report – Part A samples (EP-5, EP-6, EP-7, and EP-8). Soil delineation during the RI was performed which included the installation of ten soil borings that did not detect contamination exceeding commercial use SCOs (current use and zoning of the Site). Pesticide and metal exceedances of industrial SCOs were limited to the 2013 samples SB-5 (aldrin at 0-2 ft) and SGB-1 (dieldrin and mercury at 10-12 ft). Based on sample spacing an estimated 800 cubic yards of contaminated soil is present above commercial/industrial use. Some of this material is located between the abandoned USTs (SGB-1) and beneath the piping associated with the SVE system (SB-5). The exceedances are most likely attributed to the historical fill used to backfill the Site, based on visual indications of fill material identified in investigation borings/excavation and detections of pesticides and metals above unrestricted use at the Site in two locations beneath the building and 17 locations beneath the asphalt parking lot.

- An off-site soil vapor intrusion evaluation was performed to determine if the former uses at the Former Zoe Chemical Site had an impact on the off-site neighboring structures. The primary contaminants of concern at the Site are TCA and its degradation products. Two properties (145 Denton Avenue and 1807 Gilford Avenue) allowed access to perform the evaluation. A sub-slab and indoor air sample were obtained from each of the properties. The samples were compared to the NYSDOH decision matrices and NYSDOH Indoor Air Guidelines. The results at the 145 Denton Avenue property fell in the "no further action" range as all compounds were below recommended action levels in the NYSDOH references. However, the results of the 1807 Gilford Avenue property identified PCE and TCE in the "mitigate" range as these compounds exceeded thresholds in the decision matrices. PCE at 1807 Gilford was higher than PCE detections on the western side of the Site. The Site's primary contaminant (TCA) was detected at significantly lower concentrations than PCE and TCE, and TCA concentrations did not warrant any further action. PCE and TCE compounds concentrations and corresponding action are likely related to the 1807 Gilford property's historical use as a machine shop from approximately 1969 to 1980 (according to Sanborn Maps). Additionally, a May 2011 Site Characterization Report written by Mactec identified elevated levels of TCE and PCE in

the soil vapor near the 1807 Gilford property. Based on this information, there is no basis to conclude that the Former Zoe Chemical Site has had a direct negative impact on the off-site properties.

- The off-site soil vapor intrusion evaluation also included the collection of two soil vapor samples near the boundaries of the Site where no structures exist (north and west) to obtain interior sub-slab samples. These samples were installed to five feet below grade. There are no standards for soil vapor. Low levels of VOCs were identified in both samples at similar concentrations. TCA ranged from not detected in SV-1 to 4.2 ug/m^3 in SV-2. PCE was identified at a concentration of 285 ug/m^3 in SV-2. TCE was also identified in SV-2 at a concentration of 53.6 ug/m^3. The low levels of VOCs are not anticipated to impact structures further to the west and north as they are already low and will continue to decrease if they migrate from the Site.

- The off-site public water supply well no. 20/N000017 is located adjacent to the Site (to the north). CA RICH obtained and reviewed the raw data provided by the Western Nassau Water District from December 2011 through August 2017. The production well log provided details that the screened interval for the well exists between 398 and 464 feet below surface grade (66 feet) and consists of course brown sand. Clay layers were identified in the well log at 168 and 189 feet below surface grade. Clay can act as an obstruction by eliminating or reducing the flow of groundwater through it depending on its physical properties (permeability), thereby resulting in an alteration of groundwater flow paths (streamlines) in order to maintain continuity by diverting or supplementing flow via alternate paths through any adjoining higher permeability strata. However, as the depth to shallow groundwater at the Site is approximately 30 feet below grade, the clay layers at 168 and 189 feet are not anticipated to affect the flow of the groundwater in the Sites monitoring wells. TCA and its degradation products (the primary contaminants of concern for the Site) were not identified in the raw data from December 2011 through August 2017. Additionally, groundwater sampling was also performed during this RI. TCA was not identified in any of the groundwater samples obtained during this RI. Therefore, there is no basis to conclude that the Site has had a negative impact on the upgradient public supply well.

- All sample analyses (soil, groundwater, soil vapor) as well as the sample duplicates and associated field blanks and trip blanks were reported using NYSDEC ASP Category B deliverables. The laboratory data was reviewed by a qualified Data Validator and a Data Usability Summary Report (DUSR) was prepared. The results of the DUSRs indicate that acceptable system performance was maintained throughout the analysis of all samples. Good resolution and chromatographic performance were observed. Additionally, the duplicate, field blank and trip blank samples were observed to have acceptable precision. Therefore, the data prepared agrees with the raw data provided in the final report.

Summary of Human Exposure Pathways:

- People are not exposed to ingestion of contaminated groundwater because the public water supply that serves the area is monitored routinely and treated to remove contaminants before the water is distributed to consumers. People may contact contaminated soils if they dig below the building foundation or surface/Site cover. VOCs in the groundwater or soil may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process is referred to as soil vapor intrusion. Actions have been taken in the on-Site building to address the potential for inhalation of Site contaminants in indoor air. Environmental data collected off-Site identified VOCs at two locations. The contamination identified is not considered related to the Site-specific contaminants of concern.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Record of Decision dated March 2022 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.

RAOs for Environmental Protection

- Remove the source of ground or surface water contamination.

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

Soil samples were collected at the site during the Site Characterization (SC) and Remedial Investigation (RI). Shallow soil samples were collected within two feet of the surface to assess direct human exposure if the building or parking lot was removed. Subsurface soil samples were collected from a depth of two to 15 feet to assess soil contamination impacts. IRMs were performed, which removed significant soil contamination at the abandoned sanitary system and the storm drains. The results for the remaining soils, after the IRMs, indicated that soils at the site exceed the unrestricted SCO for volatile and semi volatile organics, pesticides, and inorganics, as summarized in Figure 5. The exceedances of unrestricted use SCO were detected beneath the building and the asphalt parking lot. The results indicate that soils at the site exceed the commercial use SCO for semi-volatile organics, pesticides, and inorganics, as summarized in Figure 5. The exceedances of commercial use SCO were detected beneath the asphalt parking lot. Figure 5 shows the results above unrestricted use SCO and commercial use SCO.

Figure 5 summarizes the results of all soil samples collected that exceed the Unrestricted Use SCOs and the commercial and industrial Use SCOs at the site after completion of remedial action.

2.5.2 Groundwater

Groundwater samples were collected from a temporary point and shallow permanent groundwater monitoring wells. The samples were collected from depths ranging from 30 to 85 feet below ground surface to assess groundwater conditions. The SC and RI results indicate that contamination at the site exceeds the SCGs for volatile organic compounds, pesticides, inorganics, and per- and polyfluoroalkyl substances (PFAS).

Six VOCs were detected above SCGs at the site during the SC. One of the six contaminants was TCA, which is the main contaminant of concern for the site based on SC data prior to the IRMs. The Water Authority of Western Nassau County was contacted to obtain available data for the supply well, located just north of the site, to determine if TCA impacted the supply well. The supply well is screened from 398 to 464 feet below ground surface, which is significantly deeper than the samples collected during the SC and RI. The supply well installation log identified clay layers at 168 and 189 feet below ground surface, which limit vertical migration of groundwater. Groundwater flow contours indicate groundwater flow to the southwest which is away from the supply well. Supply well data from 2000 to 2021 was reviewed and the main site contaminant, TCA, was not detected within the raw water. Based on information obtained during the RI, site contamination is not

impacting the supply well. Additionally, an air stripper is operational at this supply well to remove VOCs from the raw water.

The highest Dieldrin detection was at DGB-1, which was reevaluated during the RI by installing another temporary point (GW-1) immediately downgradient of DGB-1 and Dieldrin was not detected in sample GW-1. The next highest SC detection of dieldrin was at MW-1, which was resampled as part of the RI and determined to be non-detect. The final SC detection of dieldrin above groundwater criteria was in SGB-1 located in the parking near the site building. Dieldrin is limited to the central part of the site and immediately down-gradient of the Site.

The RI results indicate that contaminant levels in the on-site monitoring wells and off-site temporary point exceeds the SCGs for inorganics and PFAS. The inorganic and PFAS compounds found in groundwater were also found in upgradient monitoring wells and are considered to represent site background conditions. Therefore, these contaminants found in groundwater are not considered site specific contaminants of concern.

Figure 6 summarizes the results of all samples of groundwater that exceed the SCGs after completion of the remedial action.

2.5.3 Soil Vapor

The potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site soil vapor was evaluated where buildings were not located and due to the presence of buildings in the impacted area a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

During the SC, sub-slab soil vapor and indoor air samples were collected at the site to evaluate vapor intrusion. Soil vapor samples were also collected outside the building footprint during the SC to evaluate site conditions. The SC results detected VOCs, primarily TCA, in the sub-slab soil vapor beneath the building and in the soil vapor at the site, which lead to the construction of a SVE system IRM. SC results also detected 1,1-dichloroethane (DCA), chloroethane, PCE, and TCE in the soil vapor at lower concentrations than TCA. This assessment is supported by the operation of the IRM SVE system, which as of date has removed over 67 pounds of TCA, 27 pounds of DCA, 31 pounds chloroethane, two pounds of PCE, two pounds of TCE, and 0.48 pounds of vinyl chloride.

Figure 7 summarizes 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 project manager.

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 D) 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 project manager.

3.2 Institutional Controls

A series of ICs is required by the ROD 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 commercial uses only (which allows for industrial use). 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 shown on Figure 2.

These ICs are:

- The property may be used for: commercial and industrial use;
- 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 Nassau County 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(s);
- 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 noted on Figure 2, and any potential impacts that are identified must be monitored or mitigated;
- Vegetable gardens and farming on the site are prohibited; and
- An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible.

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 a minimum of asphalt pavement and concrete building slabs (the sidewalks are not part of the Site as per the survey detailing Site boundaries provided in Figure 2) . Figure 8 presents the location of the cover system and applicable demarcation layers. The Excavation Work Plan (EWP) provided in Appendix D outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed. 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 E. Any disturbance of the site's cover system must be overseen by a Professional Engineer (PE) who is licensed and registered in New York State.

3.3.2 Soil Vapor Extraction System

Soil vapor extraction (SVE) will continue to be implemented to remove VOCs from the subsurface soils and soil vapor. VOCs will be physically removed from the soil by applying a vacuum to wells that have been installed into the vadose zone (the area below the ground surface but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then treated as necessary prior to being discharged to the atmosphere. The SVE system consists of three two inch diameter wells installed into the vadose zone and screened from five feet below the ground surface to a depth of approximately 15 feet and three four inch sub-slab extraction points. The air containing VOCs extracted from the SVE wells is treated by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

When the SVE system no longer recovers significant contamination as defined in this Site Management Plan, the operation of the system will be evaluated for possible shutdown. This evaluation will assess if the system will be removed or transitioned to a sub-slab depressurization system, which would be continually operated and maintained until long-term monitoring data indicates the system is no longer needed. The system will not be shut down without NYSDEC authorization.

Drawings from the previous IRMs (that include certification pages signed and sealed by a PE who is licensed and registered in New York State) are included as: Figure 9 - Interior Sub Slab Vent Profile, Figure 10 - Exterior SVE Well Profile, Figure - 11 SVE Well/Vent Locations, and Figure - 12 Venting System Layout on Roof.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP).

3.3.3 Soil Vapor Extraction System

Soil vapor extraction (SVE) will continue to be implemented to remove VOCs from the subsurface soils and soil vapor. VOCs will be physically removed from the soil by applying a vacuum to wells that have been installed into the vadose zone (the area below the ground surface but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then treated as necessary prior to being discharged to the atmosphere. The SVE system consists of three two inch diameter wells installed into the vadose zone and screened from five feet below the ground surface to a depth of approximately 15 feet and three four inch sub-slab extraction points. The air containing VOCs extracted from the SVE wells is treated by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

When the SVE system no longer recovers significant contamination as defined in this Site Management Plan, the operation of the system will be evaluated for possible shutdown. This evaluation will assess if the system will be removed or transitioned to a sub-slab depressurization system, which would be continually operated and maintained until long-term monitoring data indicates the system is no longer needed. The system will not be shut down without NYSDEC authorization.

Drawings from the previous IRMs (that include certification pages signed and sealed by a PE who is licensed and registered in New York State) are included as: Figure 9 - Interior Sub Slab Vent Profile, Figure 10 - Exterior SVE Well Profile, Figure - 11 SVE Well/Vent Locations, and Figure - 12 Venting System Layout on Roof.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP)

3.3.4 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. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per the NYSDEC CP-43 policy.

The remedial party will also conduct any needed site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the site.

3.3.3.1 Cover (or Cap)

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 Soil Vapor Extraction System (SVE) System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC project manager. 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 to the NYSDEC project manager. Conditions that may warrant discontinuing the SVE system include:

- Once the levels of total VOCs in the raw influent decrease to a near constant or asymptotic concentration (as approved by NYSDEC) and it is demonstrated that shutdown of the system will not result in the migration of unacceptable concentrations of residual vapors to the on-site and off-site structures (as approved by NYSDOH), operation of the system will be suspended.

- A shutdown plan will be submitted to the NYSDEC for review and approval. This plan will discuss the conversion of the system to a soil vapor intrusion mitigation system or will propose sampling activities for complete shutdown of the system. The plan will include concurrent sub-slab vapor/indoor air sampling within occupied spaces to determine whether exposure concerns related to soil vapor intrusion remain.

- The overall remedy must meet the remedial action objectives of the project, and the soil vapor measurements must remain protective of the contemplated use of the on-site and off-site structures. If any improvements or changes are made to the interior building layout in areas outside of the SVE system's radius of influence, additional soil vapor intrusion sampling and/or expansion of the SVE system may be warranted. The NYSDEC and NYSDOH will be notified in advance of any such plans.

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 project manager. 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 F.

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

- Sampling and analysis of all appropriate media (e.g., indoor air, soil vapor);
- 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 annually. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a PE who is licensed and registered in New York State.. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. 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 G – 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;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;
- 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.

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 project manager 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 defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC project manager 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 SVE system will be performed on a routine basis, as identified in Table 2 Remedial System Monitoring Requirements and Schedule (see below). The monitoring of remedial systems must be conducted by a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State for the quarterly system sampling. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A complete visual inspection of the above system components and components in the manholes will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE system components to be monitored include, but are not limited to, the components included in Table 2 below.

Table 2 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Monitoring Schedule
Blower	Flow Rate Vacuum	Quarterly
System piping (risers)	Flow Rate Vacuum	Quarterly

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

4.3.2 Remedial System Sampling

Samples shall be collected from the SVE system on a quarterly basis. Sampling locations required analytical parameters and schedule are provided in Table 3 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. One Influent and one effluent sample will be collected in summa canisters fitted with "grab" laboratory calibrated regulators. The sample identification, date, start time, start vacuum, end time and end vacuum will be recorded on the tags attached to each canister and on the chain of custody. All samples will be submitted to Alpha Analytical Laboratories (Alpha) of 35 Whitney Road, Mahwah, NJ 07430, a New York State ELAP certified environmental laboratory. Transport to the laboratory will be through an Alpha courier under strict chain-of custody documentation. The samples will undergo laboratory analysis of VOCs by EPA Method TO-15.

Table 3 – Remedial System Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters**	
	VOC (EPA Method TO-15)	Schedule
SVE System Influent and Effluent-	X	Quarterly

Detailed sample collection and analytical procedures and protocols are provided in Appendix F – Quality Assurance Project Plan.

The remedial party will properly dispose of all wastes generated by the remedial system at off-site disposal facilities according to local, state and federal laws and regulations. Wastes will be tested before disposal to comply with the permit conditions of the disposal facility. Wastes generated at this site include: any water that may occasionally accumulate in the SVE system's moisture knock out drum. If water does accumulate in the SVE system's moisture knockout drum, samples of the water will be pumped out and placed in laboratory approved jars and submitted for the required analysis as per the Nassau County Department of Public Works.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the SVE system on a quarterly basis. Sampling locations, required analytical parameters and schedule are provided in Table 3 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

4.4.1 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling will be performed once the levels of total VOCs in the raw influent sample decreases to a near constant or asymptotic concentration (as approved by NYSDEC) and it is demonstrated that shutdown of the system will not result in the migration of unacceptable concentrations of residual vapors to the on-site and off-site structures (as approved by NYSDOH). A shutdown plan will be submitted to the NYSDEC for review and approval. This plan will discuss the conversion of the system to a soil vapor intrusion mitigation system or will propose sampling activities for complete shutdown of the system. The plan will include concurrent sub-slab vapor/indoor air sampling within occupied spaces to determine whether exposure concerns related to soil vapor intrusion remain. The overall remedy must meet the remedial action objectives of the project, and the soil vapor measurements must remain protective of the contemplated use of the on-site and off-site structures. If any improvements or changes are made to the interior building layout in areas outside of the SVE system's radius of influence, additional soil vapor intrusion sampling and/or expansion of the SVE system may be warranted. The NYSDEC and NYSDOH will be notified in advance of any such plans.

4.4.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix G - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network.

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 SVE system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SVE systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the SVE system is provided in Appendix H - 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 (or other Engineering Control) Performance Criteria

The remedy includes an SVE system that incorporates the three sub-slab vents installed inside the building for the pilot test, which were converted into permanent sub-slab depressurization vents. Four-inch diameter PVC ducts were extended and connected above the roof of the existing structure. These were, in turn, connected to four-inch diameter “capped” risers. Additionally, three, 2-inch SVE wells were also installed in the Site’s parking lot. These wells were horizontally connected with subsurface PVC piping which enters the Site building through the eastern exterior wall where the SVE system is located. All SVE vents and wells are connected to a moisture knock-out drum and then to an Airtech® Vacuum 4.62 HP regenerative blower. The extracted soil vapor is then passed through two 55-gallon vapor-phase-carbon drums. The treated vapor is then connected to a four-inch pipe that extends through the roof to a height of six feet above the roof line. The blower is connected to an electric panel and sub-meter.

5.3 Operation and Maintenance of the Soil Vapor Extraction System

The following sections provide a description of the operations and maintenance of the SVE system. Cut-sheets and as-built drawings for the SVE system are provided in Appendix H- Operations and Maintenance Manual.

5.3.1 System Start-Up and Testing

Installation of the remediation system began in August 2016 and was completed in September 2016. A start-up test was conducted on September 21, 2016. The system was activated, and baseline vacuum, flow, and air samples were collected. A detailed description of the system is included in the Construction Completion Report – Part B. The SVE blower has remained in continuous operation since September 27, 2016.

In the event the SVE system turns off the system is equipped with a telemetry system that will notify the QEP. There can be several reasons why the SVE system may have turned off. Many pertain to the electric service within the building or overheating during summer months. The telemetry unit can advise you to a specific problem as well as the two alarm lights within the control panel (that are identified as “Auxiliary Alarm” or “Moisture Separator High Pump”). In order to turn the SVE system back on you must identify and open the control panel that is attached to the SVE system and labeled “Control Panel”. Once the control panel is opened there are two dials labeled “Control Power” and “SVE System Vac Extraction”. The control power should be turned to “on”, and the SVE System VAC Extraction should be turned to “auto”. There is a button labeled “Ready”. This should be pushed and will turn the SVE System back on.

5.3.2 Routine System Operation and Maintenance

The SVE system is designed to be maintenance free. If any components fail (telemetry system, moisture knock out drum, sensors, blower etc.) they will be replaced/repaired. Carbon change outs (for the two 55-gallon carbon drums) will be performed when “breakthrough” concentrations of VOCs are identified in the laboratory results (effluent air) obtained during the quarterly monitoring events.

5.3.3 Non-Routine Operation and Maintenance

The SVE system as designed and operated has no non-routine operation and maintenance requirements. If any components fail (telemetry system, moisture knock out drum, sensors, blower etc.) they will be replaced/repaired.

5.3.4 System Monitoring Devices and Alarms

The SVE system has a warning device (a telemetry system) to indicate that the system is not operating properly. Additionally, the consultant will also be notified when there is blower failure, as well as when there is a high water level in the moisture knock out drum. In the event that the 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.

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.

The Site is located in the northern portion of Nassau County, NY. It is located at an elevation of approximately 67 feet. According to the FEMA Flood Map, the site is not located within a flood hazard area. The site is serviced by the Nassau County sewer system and meets all building codes for drainage.

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.

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 NYSDEC project manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

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 sent for recycling, as appropriate.

6.2.3 Building Operations

Structures including 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.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, 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.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix G – 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 project manager 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 will focus 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 principles 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 G. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a PE who is licensed and registered in New York State.

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 3 and summarized in the Periodic Review Report.

Table 4: Schedule of Interim Monitoring/Inspection Reports

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

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

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);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation);

- 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^{TM} database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the NYSDEC project manager 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 NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. 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, fire 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.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.

- 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 tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;
  - O&M data summary tables;
  - A current plume map for sites with remaining groundwater contamination; and
  - A groundwater elevation contour map for each gauging event.
- 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™ 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 Remedial Action Work Plan (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;
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, ROD or Decision Document; and
  - 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 and the cost per pound of mass removed during the certification period and during the life of the treatment system;

  - 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. Recommendations must address how receptors would be impacted. Recommendations can include:

    - Proposals to address efficiency and costs such as: instituting remote operation, system changes to decrease maintenance costs and downtime, and system changes to decrease energy use; and

    - Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of DER- 10.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a Professional Engineer licensed to practice and registered 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]."

"I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."

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

"For each institutional 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]."

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 or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager 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 project manager.

7.4 Remedial Site Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. 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 project manager and the NYSDOH project manager.

8.0 REFERENCES

NYCRR 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).

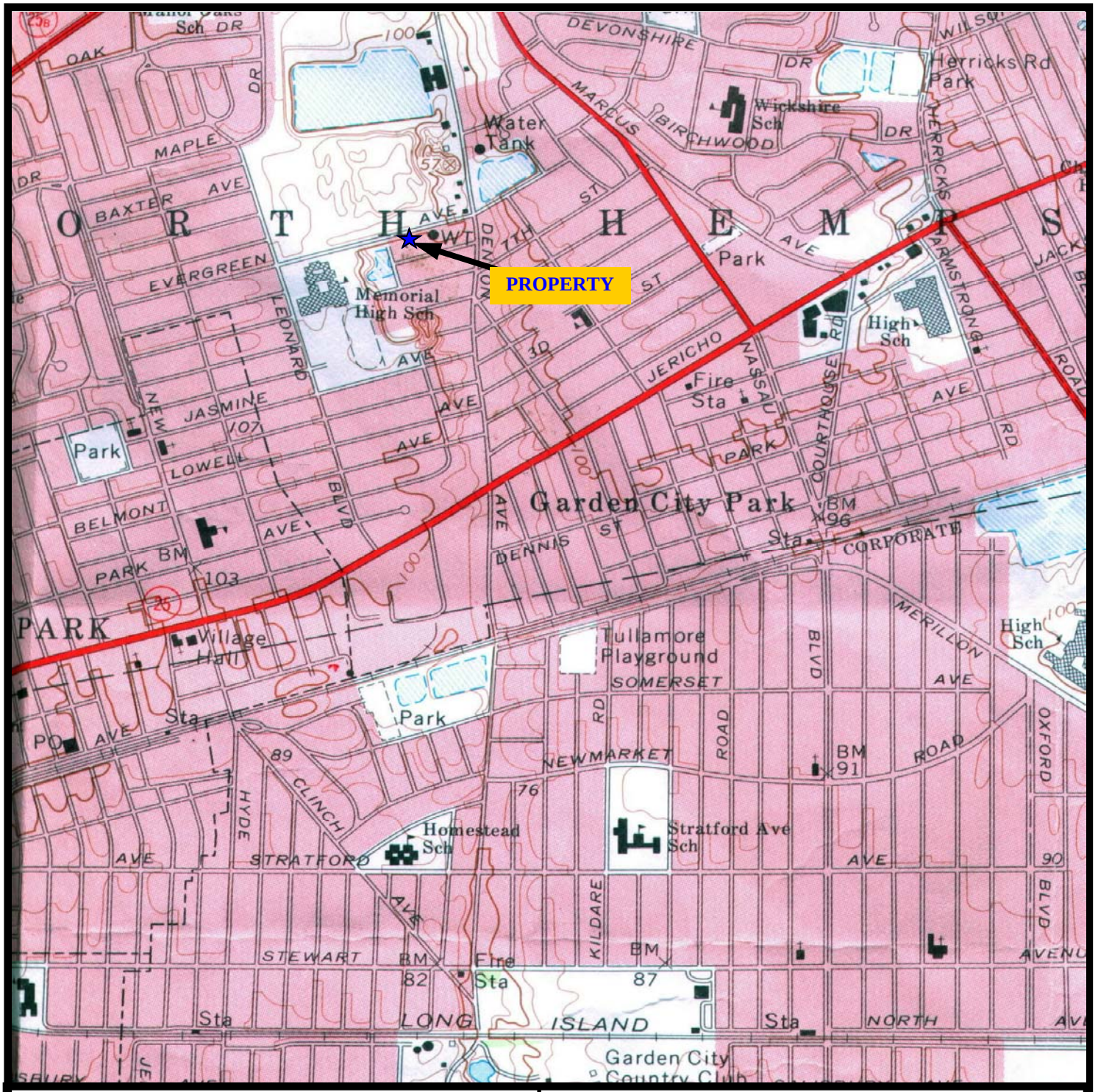
NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Air Guideline, October 2006; Revised May 2017.

TABLE

Table 1
Water Table Elevations
Former Zoe Chemical
1801 Falmouth Road
New Hyde Park, NY

Well Identification	Elevation Top of Casing (feet)	Depth to Water (feet)	Elevation of Water Table (feet)
MW-1	85.49	30.00	55.49
MW-2	82.22	26.80	55.42
MW-3	76.56	21.40	55.16
MW-4	78.67	23.45	55.22

FIGURES



Adapted from 1969 USGS Lynbrook Quadrangle

CA RICH CONSULTANTS
17 Dupont Street,
Plainview, NY 11803

TITLE: **Site Location Map**		DATE: **9/29/2017**
		SCALE: **AS SHOWN**
FIGURE: **1**	**Former Zoe Chemical** **1801 Falmouth Avenue** **New Hyde Park, New York**	DRAWN BY: **JC**
DRAWING:		APPR. BY: **JP**

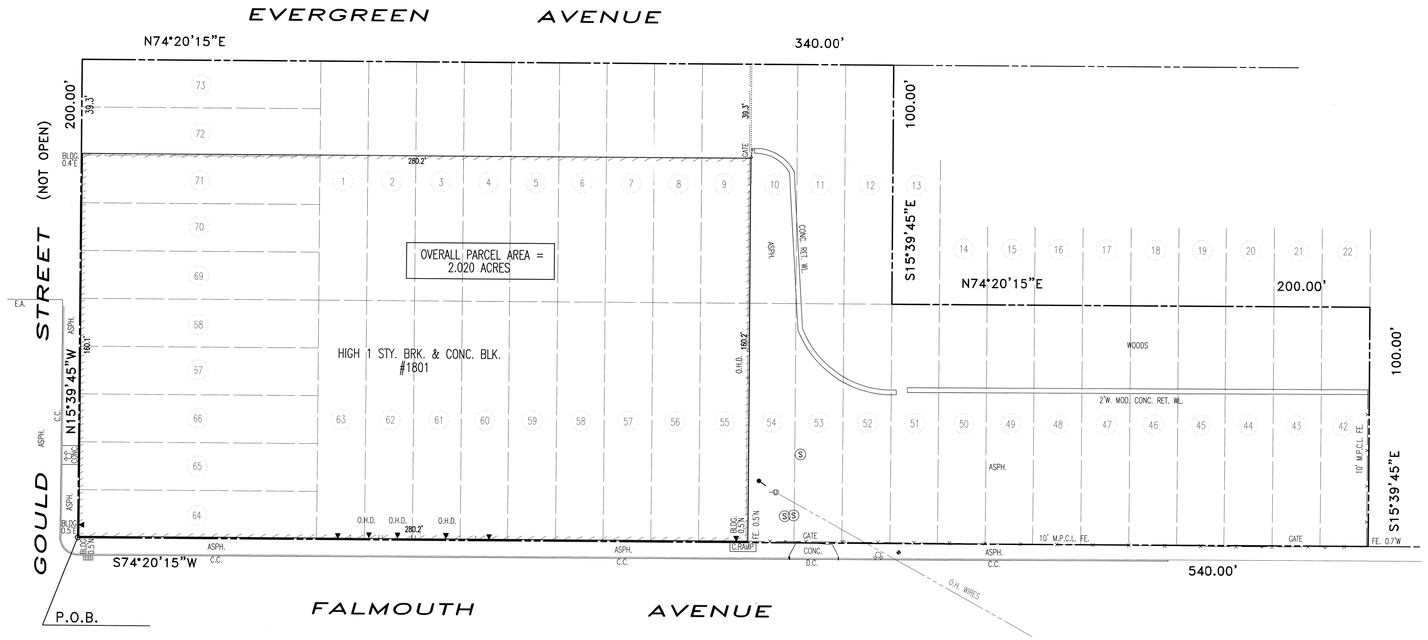


Figure 2
Site Plan

LEGEND

- SANITARY MANHOLE
- DRAINAGE MANHOLE
- WATER MANHOLE
- GAS MANHOLE
- ELECTRIC MANHOLE
- TELEPHONE MANHOLE
- UNKNOWN MANHOLE
- FIRE DEPT. MANHOLE
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- SIAMESE FIRE DEPT. CONN.
- TRAFFIC SIGNAL CONTROL BOX
- ELECTRIC BOX
- STEEL UTILITY POLE W/LITE & HIGH TENSION WIRES
- WOOD UTILITY POLE
- WOOD UTILITY POLE WITH LIGHT
- GUY WIRE
- DRAINAGE INLETS
- YARD DRAIN
- CURB INLET
- PROPERTY LINE SUBJECT
- TAX LOT LINE
- FILED MAP LOT LINE
- 472 FILED MAP LOT NUMBER
- POST
- IRON PIPE
- MONUMENT FOUND
- REBAR REBAR FOUND
- TRAFFIC SIGN
- SIGN
- SEWER/DRAINAGE LINE
- ELECTRIC LINE OVERHEAD (UNLESS OTHER WISE NOTED: BUR. ELEC.)
- GAS LINE
- WATER LINE
- 10' M.P.C.L. FENCE — DENOTES CHAIN LINK FENCE W/3 STRANDS BARB WIRE W/HT.
- 12" TREE(CALIPER)
- D.C. DEPRESSED CURB
- CURB LINES
- C.C.(CONC. CURB)
- C.C.G.(INTEGRAL CONC. CURB & GUTTER)
- STN. C. (STONE CURB)
- BL. STN. C. (BLUE STONE CURB)
- B.B.C. OR B.B.(BELGIUM BLK. CURB)
- F.C.C. (FLUSH CONC. CURB)
- A.C.(ASPH. CURB)
- DYL(DBL. YEL. LINE) SWL(SOLID WHITE LINE) — PAINTED LINES (ROADWAY MARKINGS)
- (STOP LINE)
- 11.3 DENOTES SPOT ELEVATION

SCALE 1"=30'

0FT 30FT 60FT 90FT

0M 9.14M 18.29M 27.43M

METERS

NOTES:
-UTILITIES SHOWN ARE PER FIELD OBSERVATIONS, PARTIAL MARKOUTS AND AVAILABLE RECORDS AND ARE NOT GUARANTEED.
- ELEVATIONS REFER NAVD88 DATUM
- COORDINATES REFER TO NAD83 (LIZONE)

LEGAL DESCRIPTION (OVERALL PARCEL) (ENVIRONMENTAL EASEMENT)
1801 FALMOUTH AVENUE
NEW HYDE PARK, NEW YORK 11042
NASSAU COUNTY TAX MAP DESIGNATION:
SECTION 8 BLOCK 189 LOTS 1-12 & 42-73 BOTH INCLUSIVE

All that certain plot, piece or parcel of land situate, lying and being in New Hyde Park, Town of North Hempstead, County of Nassau, State of New York, known and designated as lots 1 thru 12 incl. and lots 42 thru 73 inclusive in block 4 on a certain map entitled 'Map of New Hyde Park Estates', situate at New Hyde Park, Nassau County, N.Y., dated June 24, 1926, made by Paul H. Rosa, C.E. and surveyor, filed in the office of the Clerk of Nassau County as Map No. 615. New Map #682.

Said parcel being more particularly described as follows:

BEGINNING at a point at the intersection of the northerly line of Falmouth Avenue and the easterly line of Gould Street. Running thence from said point of BEGINNING the following courses;

Northerly along said easterly line of Gould Street,
North 15 degrees 39 minutes 45 seconds West, 200.00 feet to the southerly line of Evergreen Avenue. Thence easterly along said line,
North 74 degrees 20 minutes 15 seconds East, 340.00 feet to a point. Thence,
South 15 degrees 39 minutes 45 seconds East, 100.00 feet; thence,
North 74 degrees 20 minutes 15 seconds East, 200.00 feet; thence,
South 15 degrees 39 minutes 45 seconds East, 100.00 feet to a point on said northerly line of Falmouth Avenue. Thence westerly along said line,
South 74 degrees 20 minutes 15 seconds West, 540.00 feet to the point or place of BEGINNING.

Said parcel having an area of 2.020 acres more or less.

NOTE:

"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 more detail in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, NY 12233 or at derweb@dec.ny.gov".

STATE OF NEW YORK
STEPHEN E. RAVN
49664
LICENSED LAND SURVEYOR

SURVEY OF
LOTS 1-12, 42-73 BLK. 4
MAP OF
"NEW HYDE PARK ESTATES"
SITUATE AT
NEW HYDE PARK
TOWN OF NORTH HEMPSTEAD
NASSAU COUNTY, NEW YORK

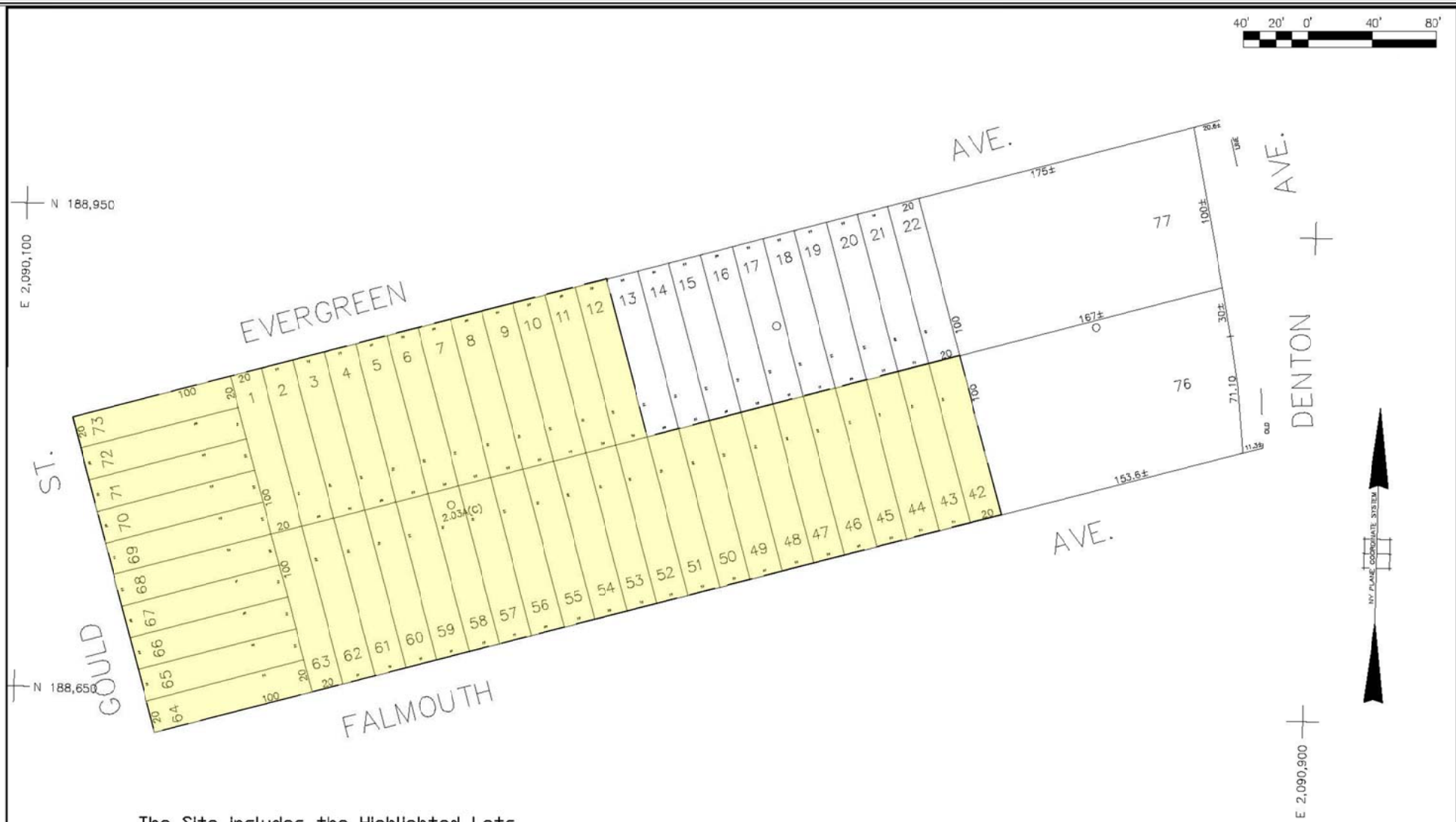
SCALE 1"=30' MAY 19, 2022

AMERICAN ENGINEERING & LAND SURVEYING P.C.
1171 old country road - ste. 6
plainview, ny 11803
tel: 516.454.7500
fax: 516.822.2743
www.aelandsurveying.com
STEPHEN E. RAVN, P.E., L.S. (L.S. NO. 49664)

R:/DWG2022/12964-1801-FALMOUTH.DWG

JOB NO. 12964 REV. 9/24/22
OLD MAP NO. 615
NEW MAP NO. 682

N.C.T.M. SEC. 8 BLK. 189 LOTS 1-12, 42-73



The Site Includes the Highlighted Lots
Block 4; Lots 1-12, and Lots 42-73

LEGEND

COUNTY LINE
TOWN LINE
VILLAGE LINE
SCHOOL DISTRICT LINE
PROPERTY LINE
SPECIAL DISTRICT LINE
BLOCK LIMIT
LOCATOR POINT
TAX MAP PARCEL NO. 249
CALCULATED ACREAGE 75AC)
DEED ACREAGE 1750
SCALED DIMENSION 30'(S)
DEED DIMENSION 185.58
REFERENCE MAPS
MAP NO.

SPECIAL DISTRICTS

	DIST		DIST		DIST		DIST
POLICE		FIRE PROTECTION		PUBLIC PARKING		DRAINAGE	
County Police	3						
WATER		SANITARY				FIRE HYDRANT RENTAL	
				SEWER			
		REFUSE & GARBAGE		Nassau County Sewage Disposal District # 2	202	GARBAGE	
LIGHTING		New Hyde Park Garden City Park-Floral Park Centre	66				
Town of North Hempstead	30	REFUSE DISPOSAL		PARK		FISCALATOR	
LIBRARY				New Hyde Park	36		
		SEWAGE COLLECTION				WATER POLLUTION CONTROL	
FIRE		Sewage Collection District #2-NHP	H	IMPROVEMENT			
New Hyde Park	47					Town, County, College, Police HQ	1
						Town Highway	2
				SIDEWALK Town of North Hempstead	6		

CODE	SPECIAL DISTRICT WITHIN									
953	1	2	202	3	30	47	66	66	H	6

CODE	SPECIAL DISTRICT WITHIN									

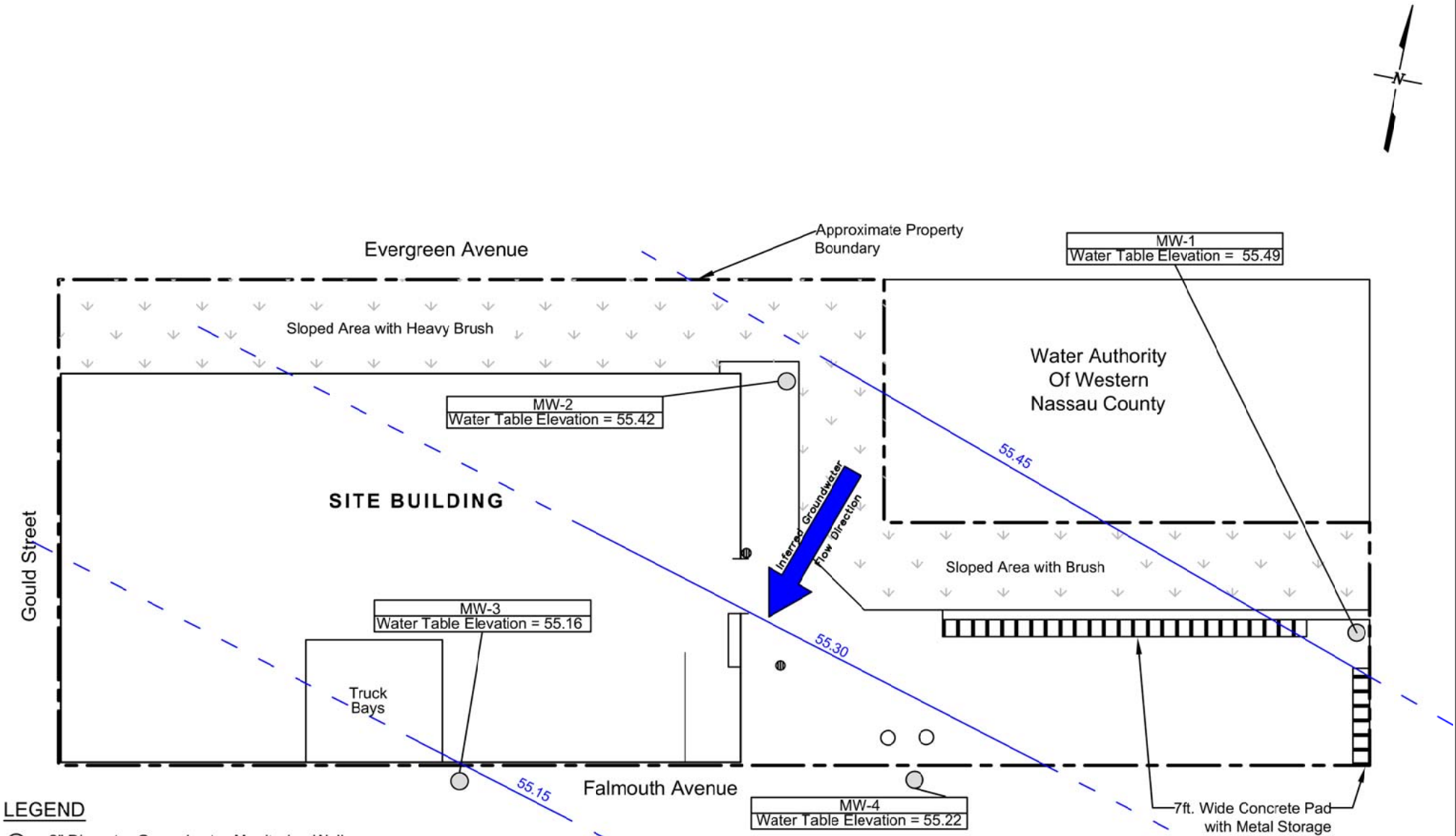
CODE	SPECIAL DISTRICT WITHIN									

CA RICH CONSULTANTS

Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: Tax Map		DATE: 9/8/2022
		SCALE: As Shown
FIGURE: 3	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: T.R.B.
DRAWING NO: 2022-1		APPR. BY: J.E.P.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-1



Note:
1. The groundwater flow data was collected on March 3, 2021 with the SVE/SSDS off for approximately 24 hours.
2. MW-4 was surveyed relative to MW-2 on March 3, 2021.
3. Water Table Elevations are in feet above mean sea level.

CA RICH CONSULTANTS
Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: Groundwater Contour Map		DATE: 9/8/2022
		SCALE: As Shown
FIGURE: 4	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: J.T.C./T.R.B.
DRAWING NO: 2022-2		APPR. BY: J.E.P.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-2

ISB-1 (0-2ft) (9/18/13)			
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDD	3.9	3.3	92,000
4,4'-DDT	15.2	3.3	47,000

ISB-2 (0-2ft) (9/18/13)			
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDT	3.9	3.3	47,000

SB-5 (0-2ft) (4/22/13)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	8.8	5	1,400
4,4'-DDT	5.8	3.3	47,000
Metals mg/kg	Result	Unres.	Com.
Chromium	32.4	30	1,500
Lead	187	63	1,000
Zinc	159	109	10,000

SB-X (0-2ft) (4/22/13)			
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	4,220	5	1,400

SGB-1 (10-12ft) (10/8/13)			
VOC ug/kg	Result	Unres.	Com.
Acetone	592	50	500,000
Ethylbenzene	3,850	1,000	390,000
m,p-Xylene	2,350	260	500,000
o-Xylene	301	260	500,000
Xylene (total)	2,650	260	500,000
SVOC ug/kg	Result	Unres.	Com.
Benzo(a)anthracene	1,200	1,000	5,600
Benzo(b)fluoranthene	1,520	1,000	5,600
Chrysene	1,290	1,000	56,000
Indeno(1,2,3-cd)pyrene	575	500	5,600
Pesticides ug/kg	Result	Unres.	Com.
alpha-Chlordane	3,280	94	24,000
Dieldrin	4,620	5	1,400
Metals mg/kg	Result	Unres.	Com.
Lead	139	63	1,000
Mercury	7.2	0.18	2.8
Zinc	354	109	10,000

SGB East (0-2ft) (10/1/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	56.2	5	1,400
SGB East (5-8ft) (10/1/18)			
Pesticides ug/kg	Result	Unres.	Com.
alpha-Chlordane	128	94	24,000
Dieldrin	109	5	1,400
Metals mg/kg	Result	Unres.	Com.
Mercury	0.27	63	1,000
SGB East (10-12ft) (10/1/18)			
Pesticides ug/kg	Result	Unres.	Com.
alpha-Chlordane	102	94	24,000
Dieldrin	97.8	5	1,400

SB-6/SSB East (0-2ft) (10/2/18)			
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDE	4.3	3.3	62,000
Metals mg/kg	Result	Unres.	Com.
Lead	122	63	1,000
SB-6/SSB East (5-8ft) (10/2/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	28.1	5	1,400
4,4'-DDD	41.3	3.3	92,000
4,4'-DDE	8.1	3.3	62,000
SB-6/SSB East (10-12ft) (10/2/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	25.5	5	1,400

SB-1 (0-2ft) (4/22/13)			
SVOC ug/kg	Result	Unres.	Com.
Phenol	540	330	500,000
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDT	6.7	3.3	47,000
Metals mg/kg	Result	Unres.	Com.
Cadmium	15.9	2.5	9.3
Copper	736	50	270
Lead	82	63	1,000
Mercury	0.32	0.18	2.8
Zinc	416	109	10,000

SB-1 East (0-2ft) (10/1/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	14.3	5	1,400
4,4'-DDT	4.4	3.3	47,000

SB-4 (0-2ft) (4/22/13)			
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDT	4.0	3.3	47,000

EP-6 (15ft) (North East) (2/22/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	320	50	500,000
2-Butanone (MEK)	160	120	500,000
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	11.2	5	680
4,4'-DDD	7.32	3.3	92,000
4,4'-DDE	4.51	3.3	62,000
Metals mg/kg	Result	Unres.	Com.
Mercury	0.26	0.18	2.8

SGB South (5-8ft) (10/1/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	14.3	5	1,400
Metals mg/kg	Result	Unres.	Com.
Lead	81.8	63	1,000
SGB South (10-12ft) (10/1/18)			
Metals mg/kg	Result	Unres.	Com.
Lead	210	63	1,000
Zinc	119	109	10,000

SB-6/SSB South (0-2ft) (10/2/18)			
Pesticides ug/kg	Result	Unres.	Com.
Dieldrin	7.3	5	1,400
4,4'-DDE	4.7	3.3	62,000
4,4'-DDT	6	3.3	47,000
Metals mg/kg	Result	Unres.	Com.
Arsenic	14.6	13	16
Lead	66.1	63	1,000
Mercury	0.19	0.18	2.8
Zinc	133	109	10,000

EP-3 (15ft) (North West) (2/21/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	7,300	50	500,000
2-Butanone (MEK)	2,000	120	500,000
Ethylbenzene	1,400	1,000	390,000
1,2,4-Trimethylbenzene	9,300	3,600	190,000
m,p-Xylene	2,600	260	500,000
Xylene (total)	2,600	260	500,000
Pesticides ug/kg	Result	Unres.	Com.
cis-Chlordane	615	94	24,000
Dieldrin	465	5	1,400
Metals mg/kg	Result	Unres.	Com.
Mercury	0.27	0.18	2.8

EP-2 (15ft) (West) (2/21/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	130	50	500,000
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDD	39.6	3.3	92,000
4,4'-DDT	65.2	3.3	47,000
Metals mg/kg	Result	Unres.	Com.
Mercury	0.29	0.18	2.8

EP-1 (15ft) (South West) (2/21/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	66	50	500,000
Pesticides ug/kg	Result	Unres.	Com.
4,4'-DDD	7.02	3.3	92,000

EP-4 (15ft) (Bottom West) (2/21/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	340	50	500,000
2-Butanone (MEK)	170	120	500,000
1,1,1-Trichloroethane	820	680	500,000
m,p-Xylene	1,100	260	500,000
o-Xylene	430	260	500,000
Xylene (total)	1,500	260	500,000
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	47.5	5	680
cis-Chlordane	323	94	24,000
Dieldrin	329	5	1,400

EP-7 (15ft) (South East) (2/22/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	1,800	50	500,000
2-Butanone (MEK)	510	120	500,000
Ethylbenzene	4,200	1,000	390,000
Toluene	970	700	500,000
1,2,4-Trimethylbenzene	11,000	3,600	190,000
m,p-Xylene	4,600	260	500,000
o-Xylene	1,100	260	500,000
Xylene (total)	5,700	260	500,000
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	1,200	5	680
cis-Chlordane	1,490	94	24,000
Dieldrin	988	5	1,400
Metals mg/kg	Result	Unres.	Com.
Mercury	0.37	0.18	2.8

EP-5 (15ft) (East) (2/22/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	1,100	50	500,000
2-Butanone (MEK)	480	120	500,000
Ethylbenzene	1,100	1,000	390,000
m,p-Xylene	480	260	500,000
Xylene (total)	480	260	500,000
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	1,390	5	680
cis-Chlordane	1,350	94	24,000
Dieldrin	664	5	1,400

EP-8 (15ft) (Bottom East) (2/22/15)			
VOC ug/kg	Result	Unres.	Com.
Acetone	1,300	50	500,000
2-Butanone (MEK)	460	120	500,000
Pesticides ug/kg	Result	Unres.	Com.
Aldrin	1,060	5	680
cis-Chlordane	336	94	24,000
Dieldrin	271	5	1,400

Evergreen Avenue
Approximate Property Boundary
Sloped Area with Heavy Brush
Water Authority Of Western Nassau County
Abandoned USTs
Former Flammable Storage Areas
ISB-5
ISB-4
Former Tank Locations
ISB-3
Gould Street
SITE BUILDING
SB-6/SSB North
Sloped Area with Brush
7ft. Wide Concrete pad with Metal Storage Racks
Garage Door
SGB North
Former Product Storage Area
Former Product Storage Area Sample
Truck Bays
2-Foot Wide Restored Trench
Metal Vault
Former SSB
Former Tank Storage Area
SB-3
SB-1 West
SB-2
SB-1 South
Sewer Connection
Former SB-6
Gate
Falmouth Avenue
SB-6/SSB West

N
W
E
S

0 20 40 60
Graphic Scale In Feet

LEGEND

- Former Exterior Soil Boring
- Former 8' Soil Vapor Sample
- Existing Grourdwater Monitoring Well
- Storm Drain
- Soil 12' Boring
- Shallow Grourdwater Boring installed down gradient from the former cesspool (across Falmouth Avenue)
- Soil Sample
- Area Excavated During Construction Completion
- Exceeds Commercial and Industrial Standards
- Exceeds Commercial Standards

Note: 1. Samples without detections over Part 375 Unrestricted Use SCOs only show sample locations.
2. All sample concentrations listed on this drawing exceed Part 375 Unrestricted Use SCOs.
3. Concentrations highlighted exceed Commercial or Commercial and Industrial Use SCOs.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-3

CA RICH CONSULTANTS
Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: Soil Samples Detected above Unrestricted, Commercial, and Industrial SCOs

DATE: 9/8/2022

SCALE: AS SHOWN

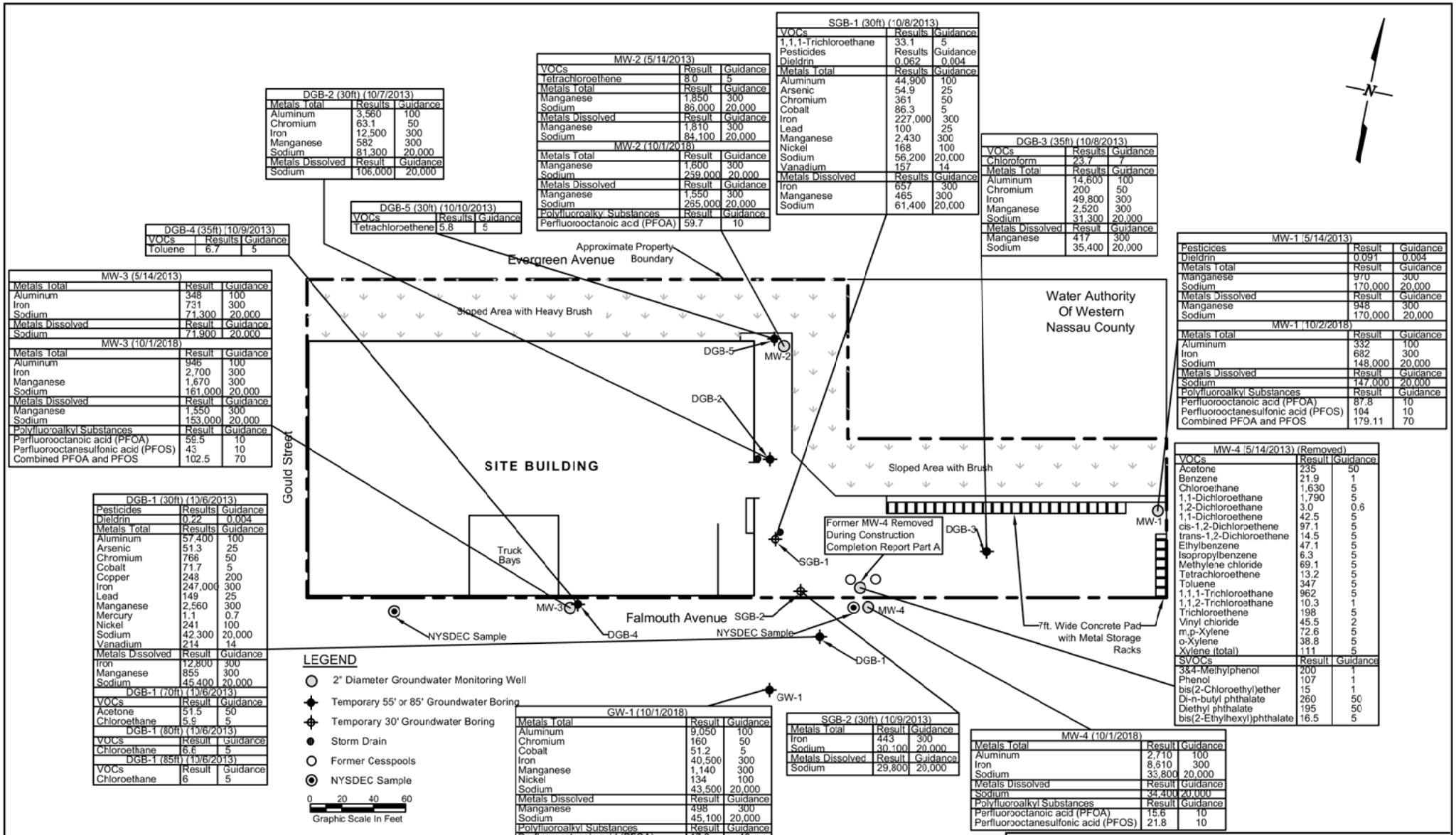
FIGURE: 5

DRAWING NO: 2022-3

Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

DRAWN BY: J.T.C./T.R.B.

APPR. BY: J.E.P.



DGB-2 (30ft) (10/7/2013)		
Metals Total	Results	Guidance
Aluminum	3,560	100
Chromium	63.1	50
Iron	12,500	300
Manganese	582	300
Sodium	81,300	20,000
Metals Dissolved	Result	Guidance
Sodium	106,000	20,000

DGB-5 (30ft) (10/10/2013)		
VOCs	Results	Guidance
Tetrachloroethene	5.8	5

DGB-4 (35ft) (10/9/2013)		
VOCs	Results	Guidance
Toluene	6.7	5

MW-3 (5/14/2013)		
Metals Total	Result	Guidance
Aluminum	348	100
Iron	731	300
Sodium	71,300	20,000
Metals Dissolved	Result	Guidance
Sodium	71,900	20,000
MW-3 (10/1/2018)		
Metals Total	Result	Guidance
Aluminum	946	100
Iron	2,700	300
Manganese	1,670	300
Sodium	161,000	20,000
Metals Dissolved	Result	Guidance
Manganese	1,550	300
Sodium	153,000	20,000
Polyfluoroalkyl Substances	Result	Guidance
Perfluorooctanoic acid (PFOA)	59.5	10
Perfluorooctanesulfonic acid (PFOS)	43	10
Combined PFOA and PFOS	102.5	70

DGB-1 (30ft) (10/6/2013)		
Pesticides	Results	Guidance
Dieldrin	0.22	0.004
Metals Total	Results	Guidance
Aluminum	57,400	100
Arsenic	51.3	25
Chromium	766	50
Cobalt	71.7	5
Copper	248	200
Iron	247,000	300
Lead	149	25
Manganese	2,560	300
Mercury	1.1	0.7
Nickel	241	100
Sodium	42,300	20,000
Vanadium	214	14
Metals Dissolved	Result	Guidance
Iron	12,800	300
Manganese	855	300
Sodium	45,400	20,000
DGB-1 (70ft) (10/6/2013)		
VOCs	Result	Guidance
Acetone	51.5	50
Chloroethane	5.9	5
DGB-1 (80ft) (10/6/2013)		
VOCs	Result	Guidance
Chloroethane	6.6	5
DGB-1 (85ft) (10/6/2013)		
VOCs	Result	Guidance
Chloroethane	6	5

MW-2 (5/14/2013)		
VOCs	Result	Guidance
Tetrachloroethene	8.0	5
Metals Total	Result	Guidance
Manganese	1,850	300
Sodium	86,000	20,000
Metals Dissolved	Result	Guidance
Manganese	1,810	300
Sodium	84,100	20,000
MW-2 (10/1/2018)		
Metals Total	Result	Guidance
Manganese	1,600	300
Sodium	259,000	20,000
Metals Dissolved	Result	Guidance
Manganese	1,550	300
Sodium	265,000	20,000
Polyfluoroalkyl Substances	Result	Guidance
Perfluorooctanoic acid (PFOA)	59.7	10

SGB-1 (30ft) (10/8/2013)		
VOCs	Results	Guidance
1,1,1-Trichloroethane	33.1	5
Pesticides	Results	Guidance
Dieldrin	0.062	0.004
Metals Total	Results	Guidance
Aluminum	44,900	100
Arsenic	54.9	25
Chromium	361	50
Cobalt	86.3	5
Iron	227,000	300
Lead	100	25
Manganese	2,430	300
Nickel	168	100
Sodium	56,200	20,000
Vanadium	157	14
Metals Dissolved	Results	Guidance
Iron	657	300
Manganese	465	300
Sodium	61,400	20,000

DGB-3 (35ft) (10/8/2013)		
VOCs	Results	Guidance
Chloroform	23.7	7
Metals Total	Results	Guidance
Aluminum	14,600	100
Chromium	200	50
Iron	49,800	300
Manganese	2,520	300
Sodium	31,300	20,000
Metals Dissolved	Result	Guidance
Manganese	417	300
Sodium	35,400	20,000

MW-1 (5/14/2013)		
Pesticides	Result	Guidance
Dieldrin	0.091	0.004
Metals Total	Result	Guidance
Manganese	970	300
Sodium	170,000	20,000
Metals Dissolved	Result	Guidance
Manganese	948	300
Sodium	170,000	20,000
MW-1 (10/2/2018)		
Metals Total	Result	Guidance
Aluminum	332	100
Iron	682	300
Sodium	148,000	20,000
Metals Dissolved	Result	Guidance
Sodium	147,000	20,000
Polyfluoroalkyl Substances	Result	Guidance
Perfluorooctanoic acid (PFOA)	87.8	10
Perfluorooctanesulfonic acid (PFOS)	104	10
Combined PFOA and PFOS	179.11	70

MW-4 (5/14/2013) (Removed)		
VOCs	Result	Guidance
Acetone	235	50
Benzene	21.9	1
Chloroethane	1,630	5
1,1-Dichloroethane	1,790	5
1,2-Dichloroethane	3.0	0.6
1,1-Dichloroethene	42.5	5
cis-1,2-Dichloroethene	97.1	5
trans-1,2-Dichloroethene	14.5	5
Ethylbenzene	47.1	5
Isopropylbenzene	6.3	5
Methylene chloride	69.1	5
Tetrachloroethene	13.2	5
Toluene	347	5
1,1,1-Trichloroethane	962	5
1,1,2-Trichloroethane	10.3	1
Trichloroethene	198	5
Vinyl chloride	45.5	2
m,p-Xylene	72.6	5
o-Xylene	38.8	5
Xylene (total)	111	5
SVOCs	Result	Guidance
3&4-Methylphenol	200	1
Phenol	107	1
bis(2-Chloroethyl)ether	15	1
Di-n-butyl phthalate	260	50
Diethyl phthalate	195	50
bis(2-Ethylhexyl)phthalate	16.5	5

GW-1 (10/1/2018)		
Metals Total	Result	Guidance
Aluminum	9,050	100
Chromium	160	50
Cobalt	51.2	5
Iron	40,500	300
Manganese	1,140	300
Nickel	134	100
Sodium	43,500	20,000
Metals Dissolved	Result	Guidance
Manganese	498	300
Sodium	45,100	20,000
Polyfluoroalkyl Substances	Result	Guidance
Perfluorooctanoic acid (PFOA)	17.3	10
Perfluorooctanesulfonic acid (PFOS)	49.2	10

SGB-2 (30ft) (10/9/2013)		
Metals Total	Result	Guidance
Iron	443	300
Sodium	30,100	20,000
Metals Dissolved	Result	Guidance
Sodium	29,800	20,000

MW-4 (10/1/2018)		
Metals Total	Result	Guidance
Aluminum	2,710	100
Iron	8,610	300
Sodium	33,800	20,000
Metals Dissolved	Result	Guidance
Sodium	34,400	20,000
Polyfluoroalkyl Substances	Result	Guidance
Perfluorooctanoic acid (PFOA)	15.6	10
Perfluorooctanesulfonic acid (PFOS)	21.8	10

CA RICH CONSULTANTS

Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Groundwater Samples Detected Exceeding SCGs

DATE: 9/8/2022

SCALE: As Shown

FIGURE: 6

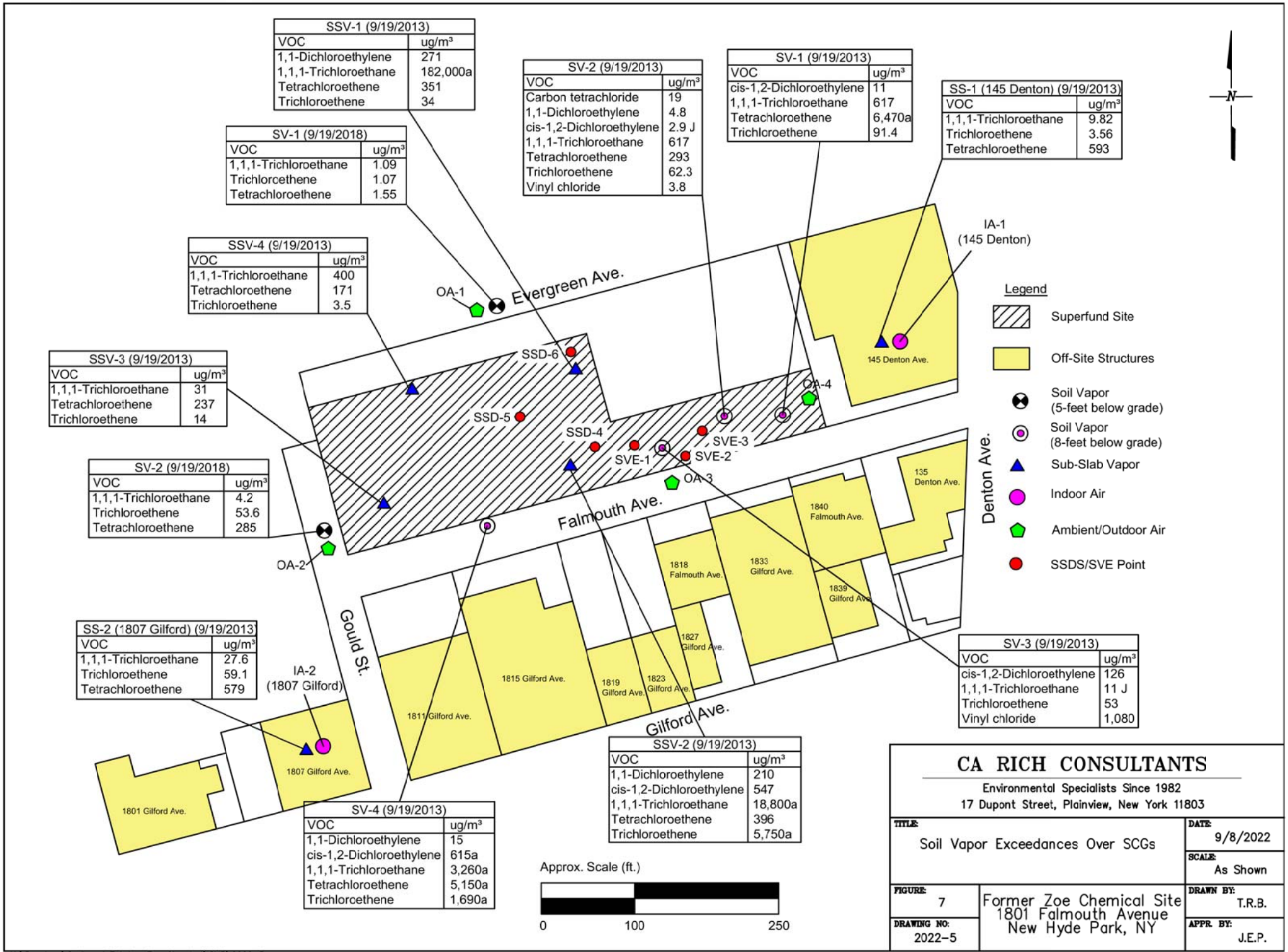
DRAWING NO: 2022-4

Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

DRAWN BY: J.T.C./T.R.B.

APPR. BY: J.E.P.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-4



CA RICH CONSULTANTS

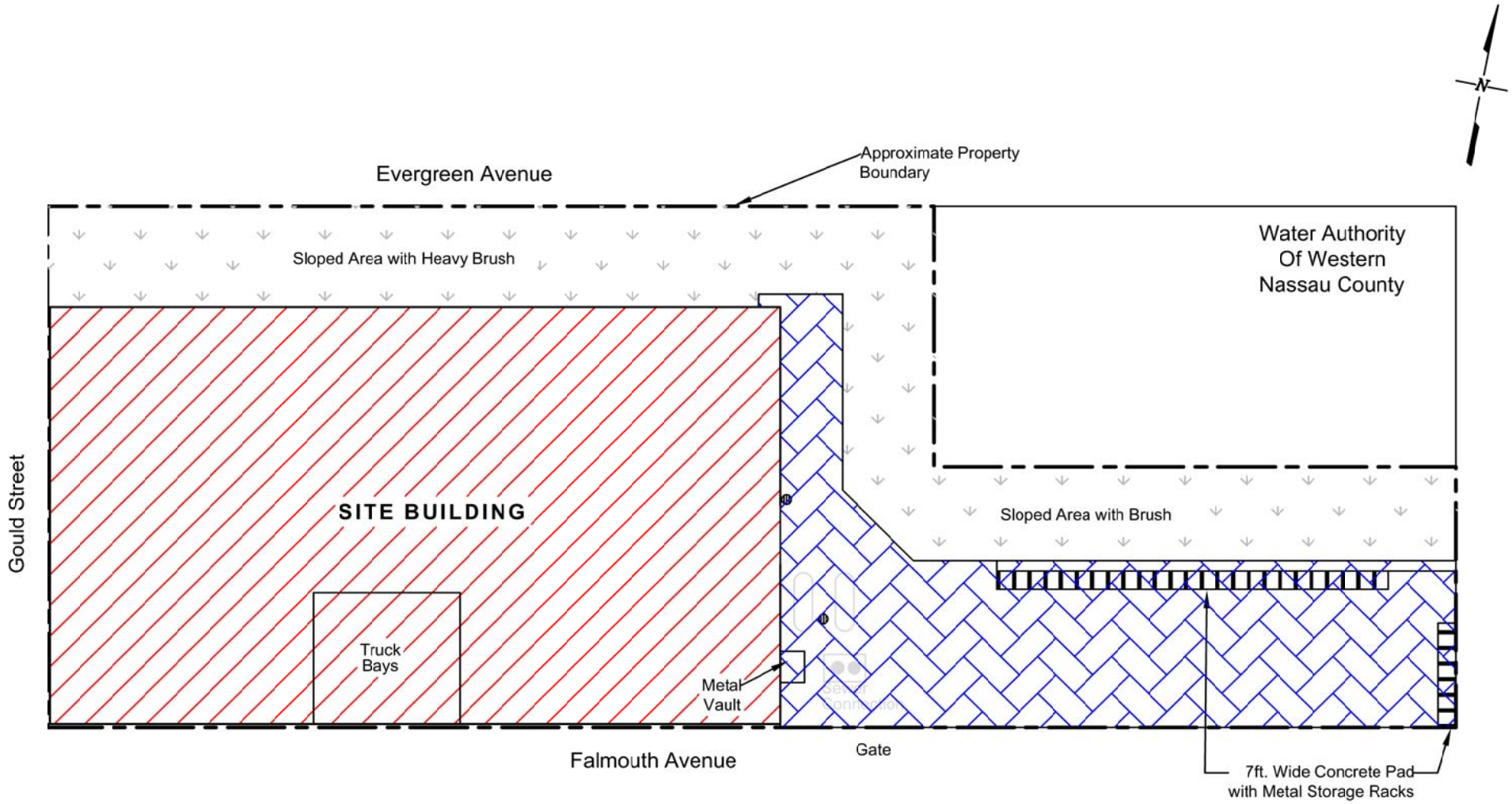
Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Soil Vapor Exceedances Over SCGs	DATE: 9/8/2022
	SCALE: As Shown
FIGURE: 7	DRAWN BY: T.R.B.
DRAWING NO: 2022-5	APPR. BY: J.E.P.

Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-5



LEGEND

Concrete Building Slab

Pavement

0 20 40 60

Graphic Scale In Feet

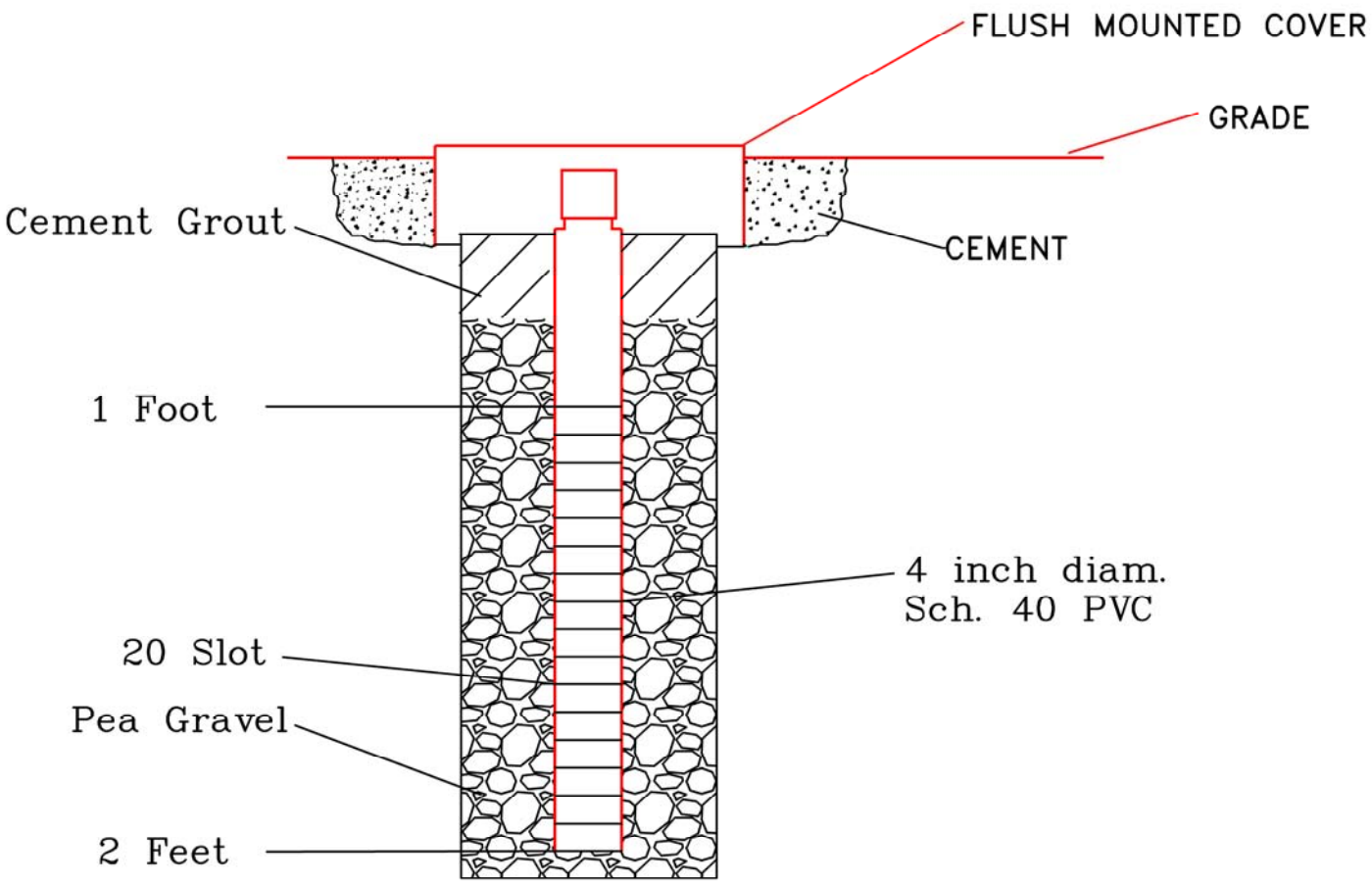
CA RICH CONSULTANTS

Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Location of Composite Cover System		DATE: 9/8/2022
		SCALE: As Shown
FIGURE: 8	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: J.T.C./T.R.B.
DRAWING NO: 2022-10		APPR. BY: J.E.P.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-10



LEGEND

Pea Gravel

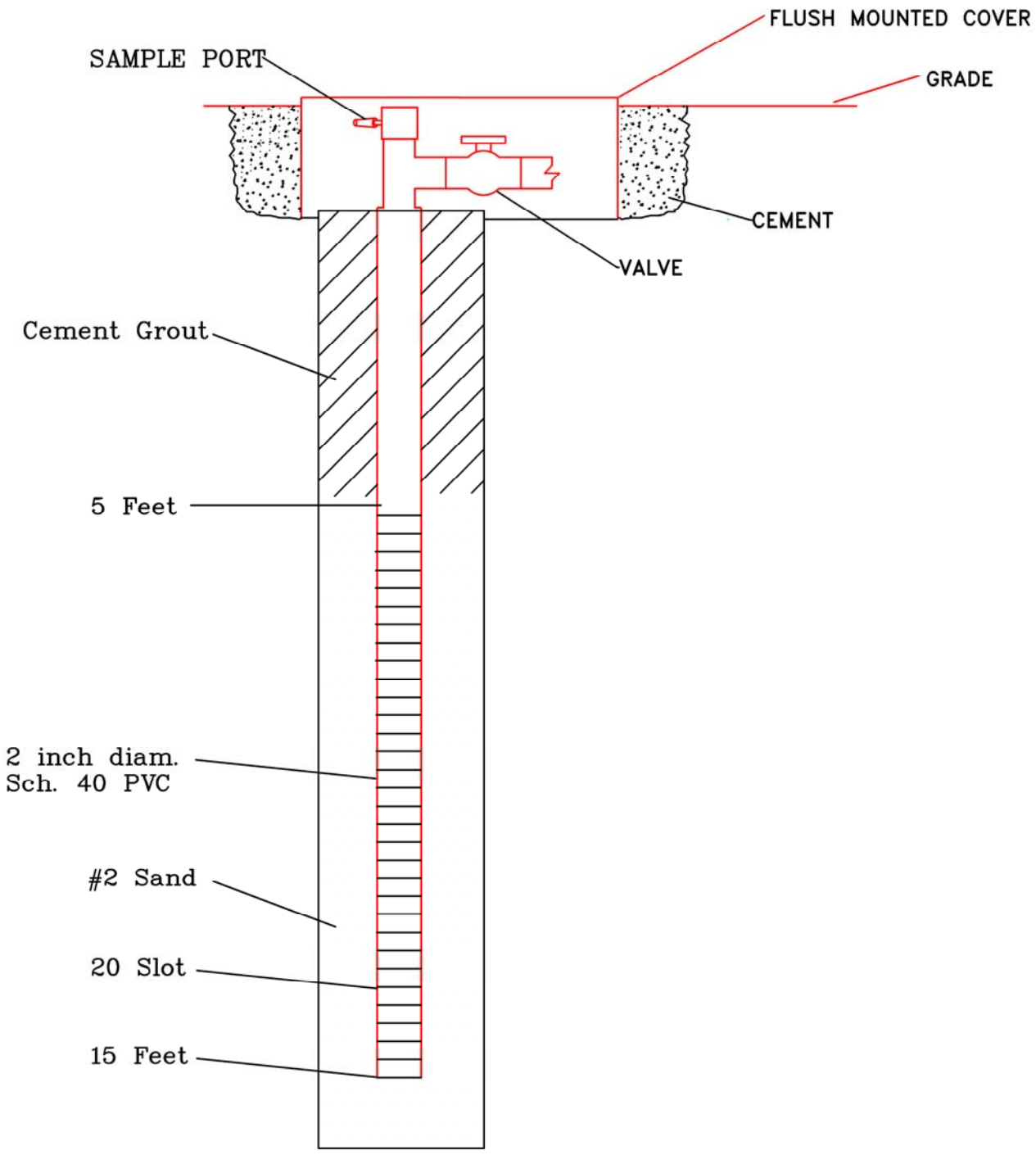
Cement Grout

Korlipara Engineering

150 Broad Hollow Road
Mellville, NY 11747

TITLE: Interior Sub-Slab Vent Profile		DATE: 9/8/2022
		SCALE: NTS
FIGURE: 9	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: T.R.B.
DRAWING NO: SMP2022-8		APPR. BY: J.E.P.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-8



LEGEND

Cement Grout

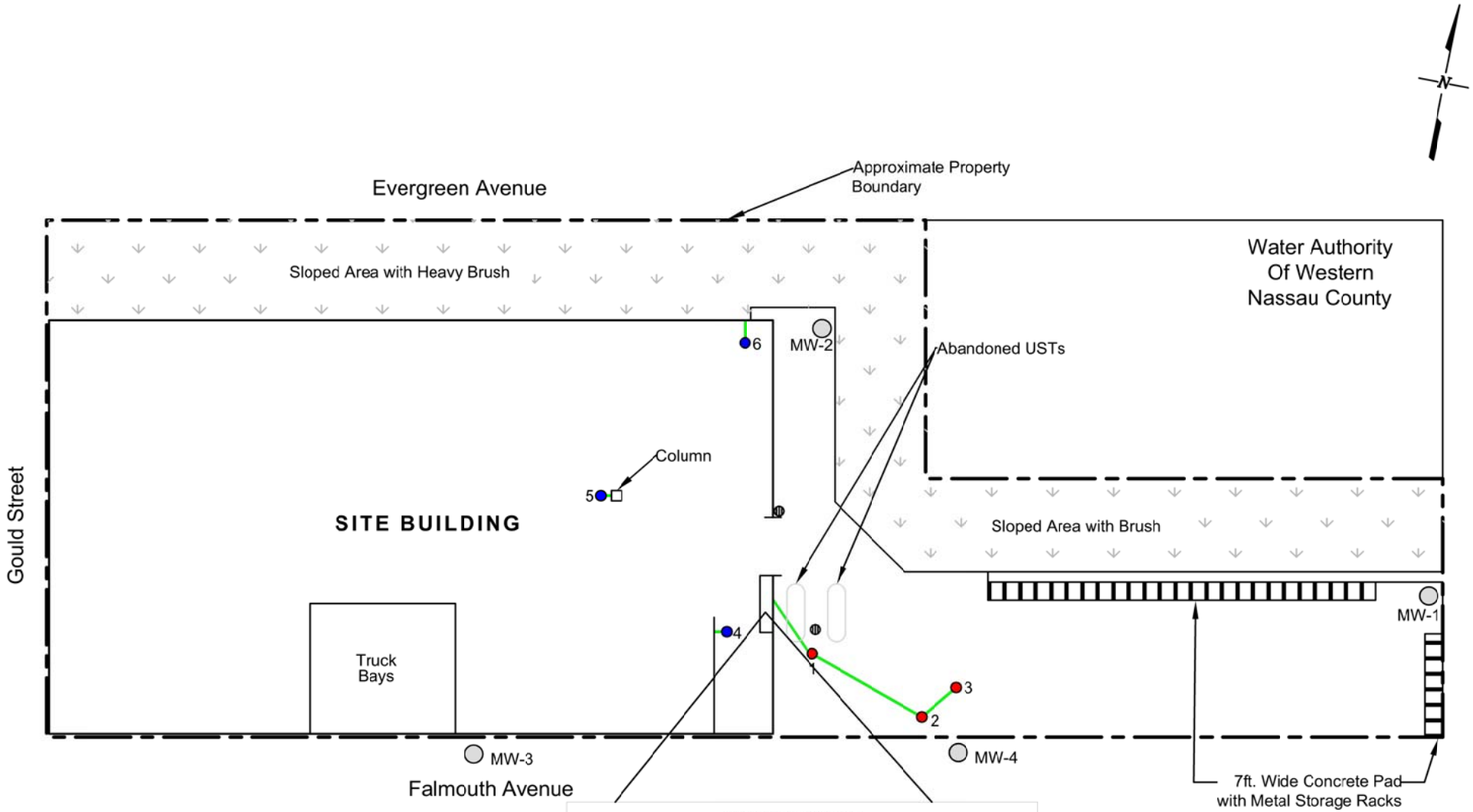
#2 Sand

Korlipara Engineering

150 Broad Hollow Road
Mellville, NY 11747

TITLE: Exterior SVE Well Profile		DATE: 9/8/2022
		SCALE: NTS
FIGURE: 10	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: T.R.B.
DRAWING NO: 2022-9		APPR. BY: R.K.K.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-9



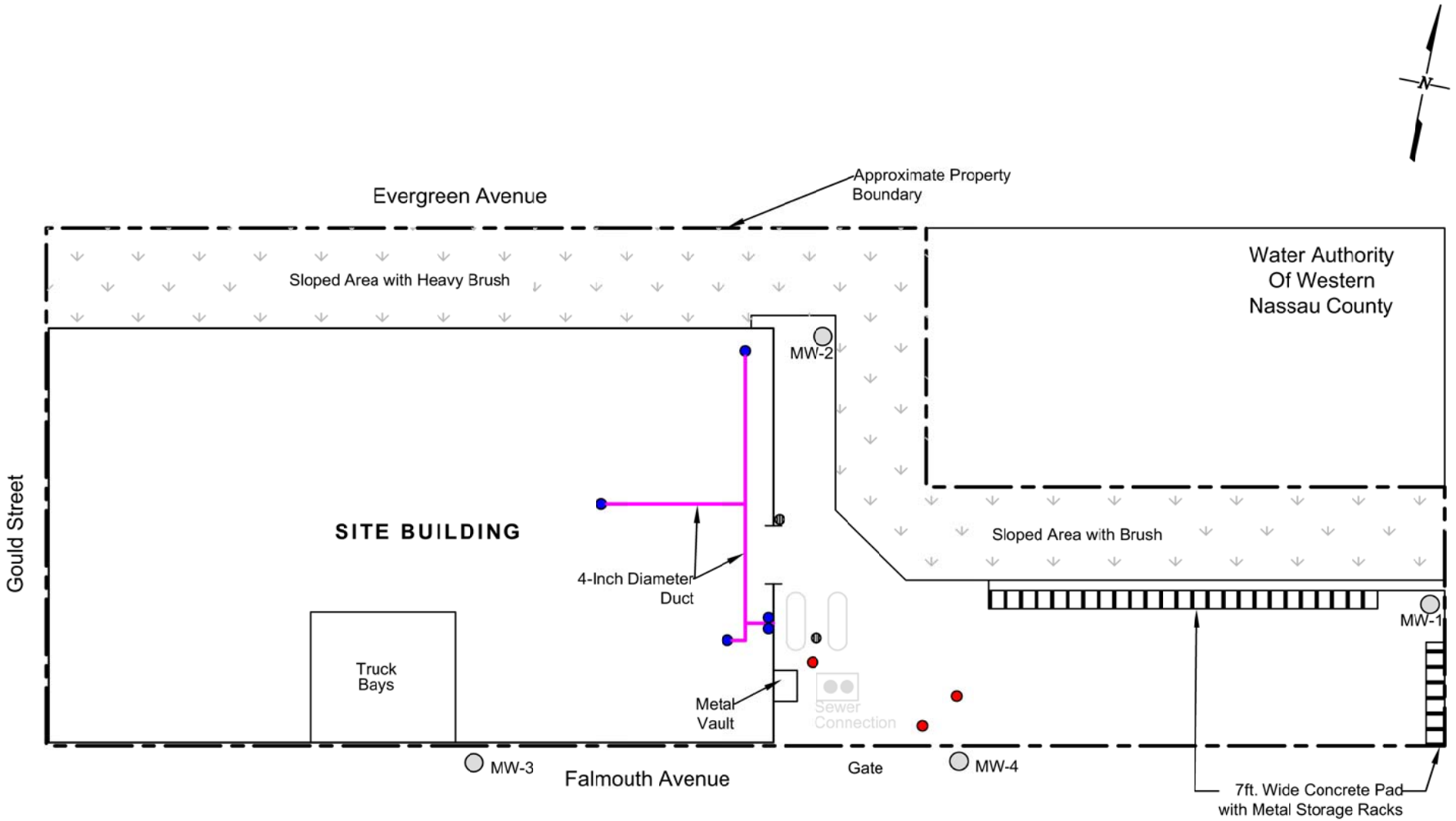
CA RICH CONSULTANTS

Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: SVE Well/Vent Locations	DATE: 9/8/2022
	SCALE: As Shown
FIGURE: 11	DRAWN BY: J.T.C./T.R.B.
DRAWING NO: 2022-7	APPR. BY: R.J.I.

Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-7



LEGEND

- 2" Diameter Groundwater Monitoring Well
- SVE Well
- 4" Diameter Riser

0 20 40 60
Graphic Scale In Feet

CA RICH CONSULTANTS

Environmental Specialists Since 1982
17 Dupont Street, Plainview, New York 11803

TITLE: Venting System Layout on the Roof		DATE: 9/8/2022
		SCALE: As Shown
FIGURE: 12	Former Zoe Chemical Site 1801 Falmouth Avenue New Hyde Park, NY	DRAWN BY: J.T.C./T.R.B.
DRAWING NO: 2022-6		APPR. BY: R.J.I.

H:\Drawings\Seaboard Estates-Zoe Chemical\SMP\2022-6

APPENDIX A

Environmental Easement

60 2024 00030426

Nassau County
Maureen OConnell
County Clerk
Mineola, NY 11501

Instrument Number: 2024- 00030426
As
D06 - AGREEMENT

Recorded On: May 17, 2024
Parties: SEABOARD ESTATES INC
TO PEOPLE OF THE STATE OF NEW YORK
Recorded By: ALL STATE ABSTRACT

Billable Pages: 9
Num Of Pages: 11
Comment:

**** Examined and Charged as Follows: ****

D06 - AGREEMENT	90.00	Blocks - Deeds - $300	300.00	Tax Affidavit TP 584	5.00

Recording Charge: 395.00

	Amount	Consideration Amount	RS#/CS#				
Tax-Transfer	0.00	0.00	RE 18556	Basic	0.00	Spec ASST	0.00
N. HEMPSTEAD				Local NY CITY	0.00	Spec ADDL SONYMA	0.00
				Additional MTA	0.00	Transfer	0.00

Tax Charge: 0.00

Property Description:

Line	Section	Block	Lot	Unit	Town Name
1	8	189	1		N. HEMPSTEAD
2	8	189	2		N. HEMPSTEAD
3	8	189	3		N. HEMPSTEAD
4	8	189	4		N. HEMPSTEAD
5	8	189	5		N. HEMPSTEAD
6	8	189	6		N. HEMPSTEAD
7	8	189	7		N. HEMPSTEAD
8	8	189	8		N. HEMPSTEAD
9	8	189	9		N. HEMPSTEAD
10	8	189	10		N. HEMPSTEAD
11	8	189	11		N. HEMPSTEAD
12	8	189	12		N. HEMPSTEAD
13	8	189	42		N. HEMPSTEAD
14	8	189	43		N. HEMPSTEAD

**** THIS PAGE IS PART OF THE INSTRUMENT ****

I hereby certify that the within and foregoing was recorded in the Clerk's Office For: Nassau County, NY

File Information:

Document Number: 2024- 00030426
Receipt Number: 3187268
Recorded Date/Time: May 17, 2024 12:01:43P
Book-Vol/Pg: Bk-D Vl-14498 Pg-816
Cashier / Station: 0 LLS / NCCL-1HZ3182

Record and Return To:

MIRABELLA & FRANZI
400 GARDEN CITY PLAZA STE 405
GARDEN CITY NY 11530

NASSAU COUNTY STATE OF NEW YORK

Maureen O'Connell

County Clerk Maureen O'Connell

Property Description:

Line	Section	Block	Lot	Unit	Town Name
15	8	189	44		N. HEMPSTEAD
16	8	189	45		N. HEMPSTEAD
17	8	189	46		N. HEMPSTEAD
18	8	189	47		N. HEMPSTEAD
19	8	189	48		N. HEMPSTEAD
20	8	189	49		N. HEMPSTEAD
21	8	189	50		N. HEMPSTEAD
22	8	189	51		N. HEMPSTEAD
23	8	189	52		N. HEMPSTEAD
24	8	189	53		N. HEMPSTEAD
25	8	189	54		N. HEMPSTEAD
26	8	189	55		N. HEMPSTEAD
27	8	189	56		N. HEMPSTEAD
28	8	189	57		N. HEMPSTEAD
29	8	189	58		N. HEMPSTEAD
30	8	189	59		N. HEMPSTEAD
31	8	189	60		N. HEMPSTEAD
32	8	189	61		N. HEMPSTEAD
33	8	189	62		N. HEMPSTEAD
34	8	189	63		N. HEMPSTEAD
35	8	189	64		N. HEMPSTEAD
36	8	189	65		N. HEMPSTEAD
37	8	189	66		N. HEMPSTEAD
38	8	189	67		N. HEMPSTEAD
39	8	189	68		N. HEMPSTEAD
40	8	189	69		N. HEMPSTEAD
41	8	189	70		N. HEMPSTEAD
42	8	189	71		N. HEMPSTEAD
43	8	189	72		N. HEMPSTEAD
44	8	189	73		N. HEMPSTEAD

**** THIS PAGE IS PART OF THE INSTRUMENT ****

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400 GARDEN CITY PLAZA STE 405
GARDEN CITY NY 11530

NASSAU COUNTY · STATE OF NEW YORK

Maureen O'Connell

County Clerk Maureen O'Connell

Dr6 9

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

THIS INDENTURE made this 1st day of April, 2024, between Owner, Seaboard Estates Inc., having an office at 1 Jericho Turnpike, New Hyde Park, County of Nassau, State of New York (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

8 189 1-12 and 42-73

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 1801 Falmouth Avenue in the City of New Hyde Park, County of Nassau and State of New York, known and designated on the tax map of the County Clerk of Nassau as tax map parcel number: Section 8 Block 189 Lots 1-12 & 42-73, inclusive, being the same as that property conveyed to Grantor by deed dated November 18, 1960 and recorded in the Nassau County Clerk's Office in Liber and Page 6792/459. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 2.02 +/- acres, and is hereinafter more fully described in the Land Title Survey dated May 19, 2022 and last revised October 27, 2023 prepared by Stephen E. Ravin, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; 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 Order on Consent Index Number: W1-1165-12-06, 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:

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 Nassau County 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;

(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 or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), 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 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, 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: 130211
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 has caused this instrument to be signed in its name.

Seaboard Estates Inc.:

By: _____

Print Name: Laurance Gordon

Title: President Date: 2/13/24

Grantor's Acknowledgment

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

On the 13th day of February, in the year 2024, before me, the undersigned, personally appeared Laurance Gordon, 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

Colette E. Mason
Notary Public, State of New York
No: 01MA609833
Qualified in Nassau County
Commission Expires 9/8/2027

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: Andrew Guglielmi
Andrew O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 18th day of April, in the year 2024 before me, the undersigned, personally appeared Andrew O. Guglielmi, 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.

Cheryl A. Salem
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified in Albany County
My Commission Expires March 3, 2027

Record + Return
Mirabella & Franzi
400 Garden City Plaza
Suite 405
Garden City NY 11530

SCHEDULE "A" PROPERTY DESCRIPTION

LEGAL DESCRIPTION (ENTIRE PARCEL) (ENVIRONMENTAL EASEMENT)
1801 FALMOUTH AVENUE
NEW HYDE PARK, NEW YORK 11042
NASSAU COUNTY TAX MAP DESIGNATION:
SECTION 8 BLOCK 189 LOTS 1-12 & 42-73 BOTH INCLUSIVE

All that certain plot, piece or parcel of land situate, lying and being in New Hyde Park, Town of New Hempstead, County of Nassau, State of New York, being known and designated as Section 8, Block 189, Lots 1-12, 42-73, being more particularly bounded and described as follows:

BEGINNING at a point at the intersection of the northerly line of Falmouth Avenue and the easterly line of Gould Street. Running thence from said point of BEGINNING the following courses;

Northerly along said easterly line of Gould Street,
North 15 degrees 39 minutes 45 seconds West, 200.00 feet to the southerly line of Evergreen Avenue. Thence easterly along said line,
North 74 degrees 20 minutes 15 seconds East, 340.00 feet to a point. Thence,
South 15 degrees 39 minutes 45 seconds East, 100.00 feet; thence,
North 74 degrees 20 minutes 15 seconds East, 200.00 feet; thence,
South 15 degrees 39 minutes 45 seconds East, 100.00 feet to a point on said northerly line of Falmouth Avenue. Thence westerly along said line,
South 74 degrees 20 minutes 15 seconds West, 540.00 feet to the point or place of BEGINNING.

Said parcel having an area of 2.020 acres more or less.

DEED DESCRIPTION (BOOK 6792 PAGE 459)

All that certain plot, piece or parcel of land situate, with the buildings and improvements thereon erected, situate, lying and being at or near New Hyde Park, Town of North Hempstead, County of Nassau, State of New York, shown and described on a certain map entitled "Map of New Hyde Park Estates", situated at New Hyde Park, Nassau County, N.Y., dated June 24, 1926, made by Paul H. Rosa, C.E. and surveyor, filed in the office of the Clerk of Nassau County as Map No. 615, more particularly described as follows:

Block 4, Lots Nos. 1 to 12, both inclusive, and Lots Nos. 42 to 73, both inclusive, New Map #682.

APPENDIX B

List of Site Contacts

Site Contact List

1801 Falmouth Avenue, New Hyde Park, NY - NYSDEC Site #1-30-211

NYSDEC Project Manager
Brian Jankauskas
Brian.jankauskas@dec.ny.gov

NYSDOH Project Manager
Mark Sergott
Mark.sergott@health.ny.gov

NYSDEC Attorney
Alali Tamuno, Esq.
Alali.tamuno@dec.ny.gov

Property Owner's Attorney
Michael Murphy, Esq.
Beveridge & Diamond, P.C.
mmurphy@bdlaw.com

Property Owner's Attorney
John Paul, Esq.
Beveridge & Diamond, P.C.
jpaul@bdlaw.com

Property Owner
Laurence Gordon
Seaboard Estates, Inc.
fmrc@fmrcli.com

Qualified Environmental Professional
CA RICH Geology Services, D.P.C.
516-576-8844

Remedial Engineer
Ravi Korlipara
Korlipara Engineering
korlipara@juno.com

APPENDIX C

Groundwater Monitoring Well Construction Logs

CA RICH Consultants, Inc.

Environmental Specialists

17 Dupont Street, Plainview, NY 11803

FIELD BORING LOG

BOREHOLE NO.: **MW-1**

TOTAL DEPTH: **45 ft**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1801 Falmouth Avenue**	DRILLING CO.:	**Zebra Environmental**
SITE LOCATION:	**New Hyde Park, NY**	DRILLER:	**Lucas**
JOB NO.:	**Former Zoe Chemical**	RIG TYPE:	**Geoprobe**
LOGGED BY:	**Jessica Proscia**	METHOD OF DRILLING:	**Direct Push/augers**
PROJECT MANAGER:	**Eric Weinstock**	SAMPLING METHODS:	**Soil Sleeves**
DATES DRILLED:	**4/24/13**	HAMMER WT./DROP	**NA**

Water level in well

DEPTH	SOIL TYPE	SOIL DESCRIPTION	SAMPLE NUMBER	Blows per ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		Fill: Tan fill composed of sand, concrete, and asphalt.		Push	0.0		Cover
5		Fill: Tan fill composed of medium grain sand and pebbles.			0.0		Surface seal
10		Fill: Dark brown fill composed of medium grain sand and pebbles.			0.0		
15		Fill: Light brown fill composed of medium grain sand and pebbles.			0.0		Grout
20		Sand Pebbles: Tan medium grain sand with some pebbles.			0.0		Sch. 40 PVC Pipe
25		Sand Pebbles: Light brown medium grain sand with some pebbles.			0.0		Bentonite Seal
30					0.0		
35					0.0		No. 2 Sand
40							20 Slot Screen
45							

NOTES: MW-1 is a two-inch diameter monitoring well.

CA RICH Consultants, Inc.

Environmental Specialists

17 Dupont Street, Plainview, NY 11803

FIELD BORING LOG

BOREHOLE NO.: **MW-2**

TOTAL DEPTH: **40 ft**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1801 Falmouth Avenue**	DRILLING CO.:	**Zebra Environmental**
SITE LOCATION:	**New Hyde Park, NY**	DRILLER:	**Lucas**
JOB NO.:	**Former Zoe Chemical**	RIG TYPE:	**Geoprobe**
LOGGED BY:	**Jessica Proscia**	METHOD OF DRILLING:	**Direct Push/augers**
PROJECT MANAGER:	**Eric Weinstock**	SAMPLING METHODS:	**Soil Sleeves**
DATES DRILLED:	**4/23/13**	HAMMER WT./DROP	**NA**

Water level in well

DEPTH	SOIL TYPE	SOIL DESCRIPTION	SAMPLE NUMBER	Blows per ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		Fill: Tan fill composed of sand, concrete, and asphalt.		Push	0.0		Cover
5					0.0		Surface seal
10					0.0		
15					0.0		Grout
20					0.0		Sch. 40 PVC Pipe
25		Sand Pebbles: Light brown medium grain sand with some pebbles.			0.0		Bentonite Seal
30					0.0		
35					0.0		No. 2 Sand
40							20 Slot Screen

NOTES: MW-2 is a two-inch diameter monitoring well.

CA RICH Consultants, Inc.
Environmental Specialists
17 Dupont Street, Plainview, NY 11803

FIELD BORING LOG

BOREHOLE NO.: **MW-3**
TOTAL DEPTH: **35 ft**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1801 Falmouth Avenue**	DRILLING CO.:	**Zebra Environmental**
SITE LOCATION:	**New Hyde Park, NY**	DRILLER:	**Lucas**
JOB NO.:	**Former Zoe Chemical**	RIG TYPE:	**Geoprobe**
LOGGED BY:	**Jessica Proscia**	METHOD OF DRILLING:	**Direct Push/augers**
PROJECT MANAGER:	**Eric Weinstock**	SAMPLING METHODS:	**Soil Sleeves**
DATES DRILLED:	**4/23/13**	HAMMER WT./DROP	**NA**

Water level in well

DEPTH	SOIL TYPE	SOIL DESCRIPTION	SAMPLE NUMBER	Blows per ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0		Sand and Silt: Dark brown medium grain silty sand with some pebbles.		Push	0.0		Cover
					0.0		Surface seal
5		Sand Pebbles: Tan medium grain sand with some pebbles.			0.0		
							Grout
10		Sand Pebbles: Light brown medium grain sand with some pebbles.					Sch. 40 PVC Pipe
					0.0		
15					0.0		Bentonite Seal
					0.0		
20					0.0		
25					0.0		No. 2 Sand
							20 Slot Screen
30							
35							

NOTES: MW-3 is a two-inch diameter monitoring well.

CA RICH Consultants, Inc.

Environmental Specialists

17 Dupont Street, Plainview, NY 11803

FIELD BORING LOG

BOREHOLE NO.: **MW-4**

TOTAL DEPTH: **45**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**1801 Falmouth Avenue**	DRILLING CO.:	**AARCO Environmental**
SITE LOCATION:	**New Hyde Park, NY**	DRILLER:	**Jay Finger**
JOB NO.:	**Former Zoe Chemical**	RIG TYPE:	**Geoprobe**
LOGGED BY:	**Jessica Proscia**	METHOD OF DRILLING:	**Direct Push**
PROJECT MANAGER:	**Jessica Proscia**	SAMPLING METHODS:	**Soil Sleeves**
DATES DRILLED:	**6/1/15**	HAMMER WT./DROP	**NA**

Water level in well

DEPTH	SOIL TYPE	SOIL DESCRIPTION	SAMPLE NUMBER	Blows per ft.	PID ppm	BORING COMPLETION	WELL DESCRIPTION
0 – 15		Fill: Tan imported clean fill and sand.			0.0, 0.0, 0.0, 0.0	Cover; Surface seal; Grout	
15 – 20		Sand Pebbles: Tan medium grain sand with some pebbles.			0.0	Sch. 40 PVC Pipe	
20 – 45		Sand Pebbles: Light brown medium grain sand with some pebbles.		Push	0.0, 0.0, 0.0, 0.0	Bentonite Seal; No. 2 Sand; 20 Slot Screen	

NOTES: This well was reinstalled after the septic excavation/removal.

APPENDIX D

Excavation Work Plan

EXCAVATION WORK PLAN

Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

NYSDEC Site Number: 130211

Prepared by

CA RICH Geology Services, D.P.C.
17 Dupont Street
Plainview, NY 11803

TABLE OF CONTENTS

EXCAVATION WORK PLAN
Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, NY

A-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the NYSDEC contacts listed in the table below. The table 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.

Name	Contact Information
Brian Jankauskas, NYSDEC Project Manager	(518) 402-9626 brian.jankauskas@dec.ny.gov
John Swartwout, NYSDEC Project Manager's Supervisor	john.swartwout@dec.ny.gov
Mark Sergott, NYSDOH Project Manager	(518) 402-7860 mark.sergott@health.ny.gov
Jason Cooper, CA RICH QEP/PG	(516)576-8844 jcooper@carichinc.com
Ravi Korlipara, PE, Remedial Engineer	(631)965-0181 korlipara@juno.com

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, any modifications of truck routes, 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, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix E of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations

A-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. 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 Sections A-6 and A-7 of this Appendix.

A-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.

A-4 MATERIALS EXCAVATION AND LOAD OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all 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. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at 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). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete. Truck wash waters 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. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

A-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 will be washed prior to leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Exact truck transport routes will be determined after a disposal facility is selected. All trucks loaded with Site materials will exit the vicinity of the Site using only approved truck routes. These are 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 stoping 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 to the extent possible in order to minimize off-site disturbance. Off-site queuing will be prohibited.

A-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 off-site in a permitted facility in accordance with all local, State 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 project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the preexcavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: 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 consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

A-7 MATERIALS REUSE ON-SITE

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) 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 the cover system or within landscaping berms. Contaminated on-site material may only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the DEC project manager.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (November 2022) guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections A-2 and A-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

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.

A-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 off-site at a permitted facility 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.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

A-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 Record of Decision. The existing cover system is comprised of a minimum of asphalt pavement, and concrete building slab. The demarcation layer, consisting of orange snow fencing material, 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. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

A-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, 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, 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 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for commercial use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 375-6.8b of 6 NYCRR. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. 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.

A-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 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.

A-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. The NYSDEC project manager will be promptly notified of the discovery.

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 semivolatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours 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.

A-13 COMMUNITY AIR MONITORING PLAN

A figure showing the location of air sampling stations based on generally prevailing wind conditions will be developed. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

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

A-13A: SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR STRUCTURES

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

A-13B: SPECIAL REQUIREMENTS FOR INDOOR WORK WITH CO-LOCATED RESIDENCES OR FACILITIES

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering

controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

A-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors offsite and on-site. Specific odor control methods to be used on a routine basis will include the use of a PID meter to screen for VOCs, and olfactory observations by Field Technicians. 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.

A-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section A-13. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

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 using 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.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- 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.

A-16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

APPENDIX E

Health and Safety Plan & Community Air Monitoring Plan

HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN

For

SITE MANAGEMENT PLAN

1801 Falmouth Avenue
New Hyde Park, NY

NYSDEC SITE #130211

October 2022
Revised May 2023

Prepared for:

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477 Madison Avenue, 15th Floor
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and

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HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN

1.0 INTRODUCTION

This Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) is developed for utilization during implementation of the Site Management Plan at 1801 Falmouth Avenue, New Hyde Park, New York, NYSDEC Site #130211 (hereinafter referred to as the 'Site'). The HASP is to be enforced by the Project Health and Safety Manager and on-site Health & Safety Coordinator (HSC). The on-site HSC will interface with the Project Manager and is vested with the authority to make field decisions including the termination of on-site activities if an imminent health and safety hazard, condition or related concern arises. Information and protocol in the HASP is applicable to all on-site personnel who will be entering the work zone.

2.0 POTENTIAL HAZARDS

2.1 Chemical Hazards

Based on the results of the Remedial Investigation, CA RICH Geology Services, D.P.C. (CA RICH) will operate as if the contaminants of concern are 1,1,1-trichloroethane (TCA), chloroethane, tetrachloroethene (PCE), trichloroethene (TCE), toluene, aldrin, dieldrin, and mercury.

The organic chemicals listed above are described as "sweet" or "aromatic" smelling and are narcotic in high concentrations. Acute exposure to significant concentrations of these chemicals can cause irritation of the skin, eyes and mucus membrane, headache, dizziness, nausea, and in high enough concentrations, loss of consciousness and death *(Sax, 1984)*. These compounds are suspected to be carcinogenic with chronic exposure.

Physical properties and additional toxicological information is included in Appendix A.

2.2 Other Health and Safety Risks

The HASP addresses the environmentally-related chemical hazards identified on the Site. Normal physical hazards associated with using drilling equipment and hand tools as well as hazards associated with adverse climatic conditions (heat & cold) also exist and represent a certain degree of risk to be assumed by on-site personnel.

Certain provisions in this Plan, specifically the use of personnel protective equipment, may tend to increase the risk of physical injury, as well as susceptibility to cold or heat stress. This is primarily due to restrictions in dexterity, hearing, sight, and normal body heat transfer inherent in the use of protective gear.

3.0 RISK MANAGEMENT

3.1 Work / Exclusion Zones

For each proposed remedial activity, a work / exclusion zone will be established surrounding the activity. Access to this area will be limited to properly trained, properly protected personnel directly involved with the on-site activities. Enforcement of the work / exclusion zone boundaries is the responsibility of the on-site Health and Safety Coordinator.

3.2 Personnel Protection

Health & Safety regulatory personnel have developed different levels of personnel protection to deal with differing degrees of potential risks of exposure to chemical constituents. The levels are designated as **A, B, C,** and **D** and ranked according to the amount of personnel protection afforded by each level. Level **A** is the highest level of protection and Level **D** is the lowest level of protection as described below.

A – Fully encapsulating suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

B – One-piece, hooded chemical-resistant splash suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

C – One-piece, hooded chemical-resistant splash suit, hard hat, canister equipped face mask, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

D – Work clothes, hard hat (optional), work boots/shoes, gloves (as needed).

The different levels are primarily dependent upon the degree of respiratory protection necessary, in conjunction with appropriate protective clothing. Levels of protection mandate a degree of respiratory protection. However, flexibility exists within the lower levels (B, C, and D) concerning proper protective clothing.

The four levels of protection were developed for utilization in situations which involve suspected or known atmospheric and/or environmental hazards including airborne contamination and skin-affecting substances.

It is anticipated that all of the investigation work will be performed using Level D protection (no respiratory protection with protective clothing requirements limited to long sleeved shirts, long pants or coveralls, work gloves and steel-toe leather work boots).

Level D may be modified by the HSC to include protective clothing or equipment (Saran-coated disposable coveralls or PVC splash suits, safety glasses, hard hat with face shield, and chemically resistant boots) based upon physical hazards, skin contact concerns, and real-time monitoring.

Real-time air monitoring for total airborne organics using either a photo-ionization detector will determine if and when an upgrade from Level D to a higher level of respiratory protection is warranted. Decisions for an upgrade from Level D to higher levels of protection, mitigative actions, and/or suspension of work are the responsibility of the Project Manager and/or the designated on-site Health & Safety Coordinator.

3.3 Air Monitoring

The Health & Safety Coordinator or his properly trained assignee will conduct “Real Time” air monitoring for total organic vapor and total particulates. 'Real-time' monitoring refers to the utilization of instrumentation, which yields immediate measurements. The utilization of real time monitoring helps determine immediate or long-term risks to on-site personnel and the general public, the appropriate level of personnel respiratory protection necessary, and actions to mitigate the recognized hazard. Air monitoring will be conducted in accordance with NYSDOH's Community Air Monitoring Program.

3.3.1 Particulate Monitoring

a. Instrumentation

Dust particulates in air will be monitored using a light scattering technique MINIRAM Model PDM-3 Miniature Real-time Aerosol Monitor (MINIRAM) or equivalent. The MINIRAM is capable of measuring airborne dust particles within the range of 10 to 100,000 micrograms per cubic meter ($\mu g/m^3$).

b. Application

Dust monitoring will occur at regular intervals excavation work activities. Monitoring will be conducted in upgradient and downgradient locations, relative to prevailing wind direction) along the perimeter of the work zone. The HSC or his designee will perform monitoring. As outlined in the NYSDOH Community Air Monitoring Plan, if particulate levels in the downwind location are 150 mg/m^3 greater than those measured in the upwind location, dust suppression techniques shall be employed.

3.3.2 Organic Vapor

a. Instrumentation

Real-time monitoring for total organic vapor (TOV) utilizes either a photo-ionization detector (PID) or flame ionization detector (FID).

b. Application

Organic vapor monitoring is performed as outlined in the NYSDOH Community Air Monitoring Plan. Specifically, monitoring shall be conducted at the downwind perimeter of the work zone periodically during work activities. If TOV levels exceed 5 parts per million (ppm) above established pre-work background levels, work activities will be halted and monitoring will be continued under the provision of a Vapor Emission Response Plan (as outlined in the Community Air Monitoring Plan).

3.4 Worker Training

Personnel overseeing the drilling will be trained, fit-tested, and medically certified (OSHA 29 CFR 1910. 134). This includes the Health & Safety Coordinator or his/her properly trained assignee.

Prior to any work, all workers involved with the project should be aware of the potential chemical, physical and biological hazards discussed in this document, as well as the general safety practices outlined below. A safety briefing by the on-site HSC and/or assistant designee shall take place at the outset of work activities.

The HSC will be available to address project-related health & safety issues a site worker (such as an equipment operator or laborer) may have regarding the site conditions. Once an issue is brought to the HCS's attention, he or she will evaluate the issue and apply the procedures outlined in this Health & Safety Plan.

3.5 General Safety Practices

All project personnel shall follow the following safety practices:

1. Avoid unnecessary skin exposure to subsurface materials. Long-sleeved shirts tucked into long pants (or coveralls), work gloves, and steel-toe leather work boots are required unless modified gear is approved by the HSC. Remove any excess residual soil from clothes prior to leaving the site.

2. No eating, drinking, gum or tobacco chewing, or smoking allowed in designated work areas. Thoroughly wash hands prior to these activities outside the work area. Avoid sitting on the ground during breaks or while eating and drinking. Thoroughly wash all exposed body areas at the end of the workday.

3. Some symptoms of acute exposure include: nausea, dizziness, light-headedness, impaired coordination, headache, blurred vision, and nose/throat/eye irritation. If these symptoms are experienced or strong odor is detected, leave the work area and immediately report the incident to the on-site HSC.

3.6 Enforcement

Enforcement of the Site Safety Plan will be the responsibility of the HSC. The Coordinator should be on-site on a full-time basis and perform or directly oversee all aspects of Project Health & Safety operations including: air monitoring; environmental mitigation; personnel respiratory and skin protection; general safety practices; documentation; emergency procedures and protocol; and reporting and recordkeeping as described below.

3.7 Reporting and Recordkeeping

Incidents involving injury, symptoms of exposure, discovery of contained (potentially hazardous) materials, or unsafe work practices and/or conditions should be immediately reported to the HSC.

A log book must be maintained on-site to document all aspects of HASP enforcement. The log is paginated and dated with entries made on a daily basis in waterproof ink, initialed by the HSC or designee. Log entries should include date and time of instrument monitoring, instrument type, measurement method, test results, calibration and maintenance information, as well as appropriate mitigative actions responding to detections. Miscellaneous information to be logged may include weather conditions, reported complaints or symptoms, regulatory inspections, and reasons to upgrade personnel protection above the normal specification (Level D).

4.0 EMERGENCIES

4.1 EMERGENCY RESPONSE SERVICES

(1)	**HOSPITAL** NYU Langone Hospital 259 First Street Mineola, NY 11501 (See Figure 1 for Map Route)	**(516) 663-0333**
(2)	**AMBULANCE**	**911**
(3)	**FIRE DEPARTMENT** **HAZARDOUS MATERIAL**	**911**
(4)	**POLICE DEPARTMENT**	**911**
(5)	**POISON CONTROL CENTER**	**(800) 222-1222**

The preceding list and associated attached map (Figure 1) illustrating the fastest route to the nearest hospital must be conspicuously posted in areas of worker congregation and adjacent to all on-site telephones (if any).

4.2 EMERGENCY PROCEDURES

4.2.1 Contact or Exposure to Suspected Hazardous Materials

In the event of a fire, chemical discharge, medical emergency, workers are instructed to immediately notify the HSC and proper emergency services (posted). Should physical contact with unknown or questionable materials occur, immediately wash the affected body areas with clean water and notify the HSC. Anyone experiencing symptoms of exposure should exit the work area, notify the HSC, and seek medical attention.

4.2.2 Personnel Decontamination, First Aid, and Fire Protection

The first step in the treatment of skin exposure to most chemicals is to rinse the affected area with water. For this reason, adequate amounts of water and soap are maintained on-site in a clearly designated and readily-accessible location. Portable emergency eyewash stations and a first aid kit must be made available and maintained in the same locations as the potable water. Fire extinguishers are also to be maintained on-site in designated locations. All on-site personnel are to be made aware of the locations of the above-mentioned on-site Health & Safety accommodations during the initial Health and Safety briefing.

4.2.3 Ingress/egress

Clear paths of ingress/egress to work zones and site entrances/exits must be maintained at all times. Unauthorized personnel are restricted from accessing the site.

5.0 COMMUNITY AIR MONITORING PLAN

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. This plan includes the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations during excavation activities. If the downwind particulate level is 150 µg/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s).

Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor

levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and, if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.

2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

6.0 HEALTH AND SAFETY PLAN REFERENCES

1. American Conference Governmental Industrial Hygienists, 1989; Threshold Limit Values And Biological Exposure Indices, 111 Pp.

2. Geoenvironmental Consultants, Inc.; 1987; Safety & Operations At Hazardous Materials Sites

3. NIOSH Guide To Chemical Hazards, 1985, US Department Of Health And Human Services, Centers For Disease Control

4. US Department Of Labor Occupational Safety & Health Administration, 1989; Hazardous Waste Operations And Emergency Response Interim Final Rule, 29 CFR Part 1910

5. Sax, N. I. Dangerous Properties Of Industrial Materials; © 1984

7.0 KEY PERSONNEL

Responsibility	Name and Phone Number	Task Description
Project Manager	Jessica Proscia (516) 576-8844	Oversee and coordinate all technical aspects for the project
Site Safety Officer	Jessica Proscia (516) 576-8844	Coordinate and inspect all health and safety operations from the project site
Client Representative	Laurence Gordon (516) 354-4308	
Project Manager Alternate	Jason Cooper (516) 576-8844	
Site Safety Officer Alternate	Jason Cooper (516) 576-8844	

Figure 1

Hospital Route Map

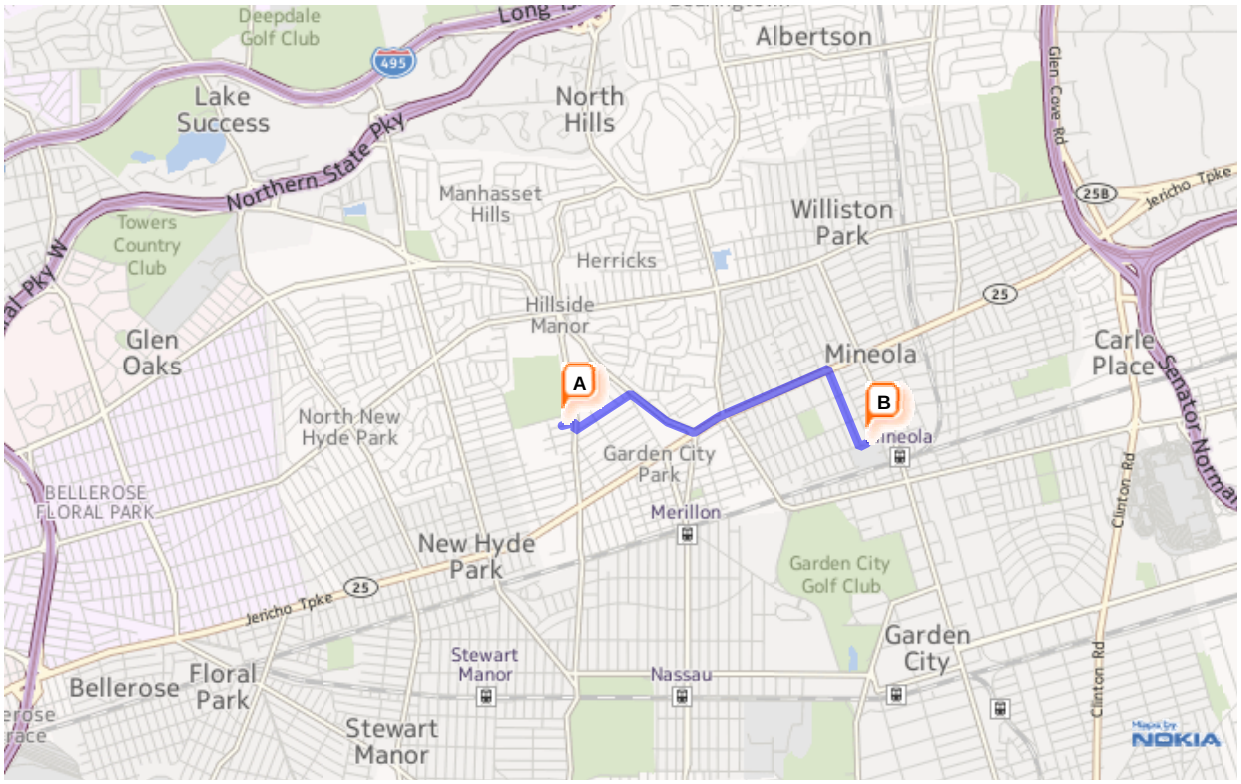
YAHOO! MAPS

Directions From 1801 Falmouth Avenue to Winthrop University Hospital. 259 First Street, Mineola, NY
516-663-0333

A **1801 Falmouth Ave, New Hyde Park, NY 11040-4028**

B **259 1st St, Mineola, NY 11501-3957**

Total Distance: **2.04 miles** — Total Time: **6 mins**



A **1801 Falmouth Ave, New Hyde Park, NY 11040-4028**		
1.	Head toward **Denton Ave** on **Falmouth Ave**.	Go for 370 ft.
2.	Turn **right** onto **Denton Ave**.	Go for 255 ft.
3.	Turn **left** onto **7th St**.	Go for 0.3 mi.
4.	Turn **right** onto **Marcus Ave**.	Go for 0.4 mi.
		Go for 0.7 mi.

APPENDIX A

Physical Properties and Toxicological Information

Material Safety Data Sheet
1,1,1-Trichloroethane

ACC# 14370

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,1,1-Trichloroethane
Catalog Numbers: AC294930000, AC294930250, AC294932500, AC327940000, AC327940010, AC327942500, S80231, T391-20, T391-4, T398-4
Synonyms: Methyl chloroform; Methyltrichloromethane; Trichloroethane; Trichloromethylmethane; 1,1,1-TCE.
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
71-55-6	1,1,1-Trichloroethane	>96	200-756-3
123-91-1	1,4-Dioxane	2.5	204-661-8
106-88-7	1,2-Butylene oxide	0.47	203-438-2
75-52-5	Nitromethane	0.34	200-876-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid.
Warning! Causes eye, skin, and respiratory tract irritation. May be harmful if inhaled. May cause central nervous system depression. This is a CFC substance which destroys ozone in the upper atmosphere. Destruction of the ozone layer can lead to increased ultraviolet radiation which, with excess exposure to sunlight, can lead to an increase in skin cancer and eye cataracts.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes mild eye irritation. Vapors may cause eye irritation.
Skin: Causes skin irritation. Prolonged or repeated contact may dry/defat the skin and cause irritation. 1,4-Dioxane may cause an allergic skin reaction, and absorption of this substance may cause systemic toxicty. Methyl chloroform is an acknowledged skin irritant in guinea pigs, where a single topical application of 1 ml or repeated contact over 3 days causes edema, erythema, inflammation, and cellular degeneration. There is one case report of allergic contact dermatitis in a worker exposed to 1,1,1-trichloroethane. It is not possible to draw any conclusions from this single report.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. Low hazard for usual industrial handling. Although there are no case reports of aspiration, it was induced in rats in one study. In addition, based on its physical properties (viscosity and surface tension), it seems likely that 1,1,1-

trichloroethane can be aspirated.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause narcotic effects in high concentration. Causes irritation of the mucous membrane and upper respiratory tract. Numerous deaths due to depression of CNS control of respiration and fatal cardiac arrhythmia have been reported from methyl chloroform inhalation (accidental or intentional) in poorly ventilated rooms, pits, tanks, and other small areas (Documentation of the TLV). Cases of intentional abuse of 1,1,1-trichloroethane in substances such as typewriter correction fluid for euphoric symptoms have been documented.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis. Exposure to high concentrations may cause central nervous system depression. Studies with solvent abusers have established that severe cardiac arrhythmias may result from cardiac sensitization, where the heart has an increased response to circulating epinephrine. In these cases, exposures by far exceeded occupational relevant levels. Liver effects have been observed in some animal studies at high

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Alcoholic beverage consumption may enhance the toxic effects of this substance.

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. Use water spray to keep fire-exposed containers cool. Substance is nonflammable. Vapors may accumulate in confined spaces Methyl chloroform burns only in excess oxygen or in air if a strong source of ignition is present. No flash point in conventional closed tester; however, vapors in containers can explode if subjected to high energy source.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: Not applicable.
Autoignition Temperature: 500 deg C (932.00 deg F)
Explosion Limits, Lower:7.0 vol %
Upper: 16 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid breathing vapor.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in aluminum containers.

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 general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,1,1-Trichloroethane	350 ppm TWA; 450 ppm STEL	700 ppm IDLH	350 ppm TWA; 1900 mg/m3 TWA
1,4-Dioxane	20 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	500 ppm IDLH	100 ppm TWA; 360 mg/m3 TWA
1,2-Butylene oxide	none listed	none listed	none listed
Nitromethane	20 ppm TWA	750 ppm IDLH	100 ppm TWA; 250 mg/m3 TWA

OSHA Vacated PELs: 1,1,1-Trichloroethane: 350 ppm TWA; 1900 mg/m3 TWA 1,4-Dioxane: 25 ppm TWA; 90 mg/m3 TWA 1,2-Butylene oxide: No OSHA Vacated PELs are listed for this chemical. Nitromethane: 100 ppm TWA; 250 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
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: Liquid
Appearance: colorless
Odor: Sweet, mild chloroform-like.
pH: Not applicable.
Vapor Pressure: 100 mm Hg @ 20 deg C
Vapor Density: 4.55 (air=1)
Evaporation Rate:1.0 (carbon tetrachloride=1)
Viscosity: 0.86 cP @ 20 deg C
Boiling Point: 74 deg C
Freezing/Melting Point:-33 deg C
Decomposition Temperature:> 260 deg C
Solubility: Insoluble.
Specific Gravity/Density:1.338 (water=1)
Molecular Formula:C2H3Cl3
Molecular Weight:133.38

Section 10 - Stability and Reactivity

Chemical Stability: Because of 1,1,1-TCE's reactivity with magnesium, aluminum, & their alloys, inhibitors (like 1,4-dioxane, 1,3-dioxolane, isobutyl alcohol, or nitroethane) are often added to increase the stability of the solvent & prevent corrosion of metal parts. 1,1,1-Trichloroethane reacts slowly with water to produce hydrochloric acid.
Conditions to Avoid: High temperatures, ignition sources, moisture, confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents, strong bases, aluminum, magnesium, chemically active metals.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 71-55-6: KJ2975000
CAS# 123-91-1: JG8225000
CAS# 106-88-7: EK3675000
CAS# 75-52-5: PA9800000
LD50/LC50:
CAS# 71-55-6:
Draize test, rabbit, eye: 100 mg Mild;
Draize test, rabbit, eye: 2 mg/24H Severe;
Draize test, rabbit, skin: 5 gm/12D (Intermittent) Mild;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Inhalation, mouse: LC50 = 3911 ppm/2H;
Inhalation, mouse: LC50 = 29492 ppm/10M;
Inhalation, rat: LC50 = 17000 ppm/4H;
Inhalation, rat: LC50 = 14250 ppm/7H;
Inhalation, rat: LC50 = 20000 ppm/2H;
Oral, mouse: LD50 = 6 gm/kg;
Oral, rabbit: LD50 = 5660 mg/kg;
Oral, rat: LD50 = 9600
CAS# 123-91-1:
Draize test, rabbit, eye: 100 mg Severe;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Inhalation, mouse: LC50 = 37 gm/m3/2H;
Inhalation, rat: LC50 = 46 gm/m3/2H;
Oral, mouse: LD50 = 5300 mg/kg;
Oral, rabbit: LD50 = 2 gm/kg;
Oral, rat: LD50 = 4200 mg/kg;
Skin, rabbit: LD50 = 7600 uL/kg;
.

CAS# 106-88-7:
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 6300 mg/m3/4H;
Oral, rat: LD50 = 500 mg/kg;
Skin, rabbit: LD50 = 2100 uL/kg;
.

CAS# 75-52-5:
Oral, mouse: LD50 = 950 mg/kg;
Oral, rat: LD50 = 940 mg/kg;
.

Carcinogenicity:
CAS# 71-55-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 123-91-1:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/88
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 106-88-7:

- **ACGIH:** Not listed.
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

CAS# 75-52-5:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 5/1/97
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: No information found
Teratogenicity: Animal evidence suggests that 1,1,1-TCE is not teratogenic at exposures which are not maternally toxic. Slight fetotoxicity (for example, reduced fetal weight) has been reported at doses which were not maternally toxic.
Reproductive Effects: Animal evidence suggests that 1,1,1-TCE does not cause reproductive effects.
Mutagenicity: Evidence from studies using live animals suggests that 1,1,1-trichloroethane is not mutagenic.
Neurotoxicity: Some studies using sensitive neurobehavioural tests have shown altered scores for exposed workers. However, whether or not these results indicate nervous system damage is not clear. Other studies with 1,1,1-TCE have not shown any changes.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: EC50 = 52.9 mg/L; 96 Hr; Flow-through at 25.5°CFish: Bluegill/Sunfish: LC50 = 72 mg/L; 96 Hr; Static bioassayFish: Fathead Minnow: LC50 = 52.9 mg/L; 96 Hr; Flow-through at 25.5°CFish: Sheepshead minnow: LC50 = 53-72 mg/L; 96 Hr; UnspecifiedWater flea Daphnia: EC50 > 530 mg/L; 48 Hr; Unspecified Releases to surface water will decrease in concn almost entirely due to evaporation. Spills on land will decrease in concentration almost entirely due to volatilization and leaching.
Environmental: Releases to air may be transported long distances and partially return to earth in rain. In the troposphere, 1,1,1-trichloroethane will degrade very slowly by photooxidation and also slowly diffuse to the stratosphere where photodegradation will be rapid. This substance has a high potential for oxone depletion.
Physical: No information available.
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# 71-55-6: waste number U226.
CAS# 123-91-1: waste number U108.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	1,1,1-TRICHLOROETHANE	1,1,1-TRICHLOROETHANE
Hazard Class:	6.1	6.1
UN Number:	UN2831	UN2831
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 71-55-6 is listed on the TSCA inventory.
CAS# 123-91-1 is listed on the TSCA inventory.
CAS# 106-88-7 is listed on the TSCA inventory.
CAS# 75-52-5 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 71-55-6: Effective 10/4/82, Sunset 10/4/92 CAS# 106-88-7: Effective 10/4/82, Sunset 10/4/92
CAS# 75-52-5: Effective 4/13/89, Sunset 12/19/95
Chemical Test Rules
CAS# 71-55-6: 40 CFR 799.5000
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# 71-55-6: 1000 lb final RQ; 454 kg final RQ CAS# 123-91-1: 100 lb final RQ; 45.4 kg final RQ
CAS# 106-88-7: 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.
SARA Codes
CAS # 71-55-6: immediate.
CAS # 123-91-1: delayed, fire.
CAS # 106-88-7: immediate.
CAS # 75-52-5: immediate, delayed, fire, reactive.
Section 313
This material contains 1,1,1-Trichloroethane (CAS# 71-55-6, >96%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR
This material contains 1,4-Dioxane (CAS# 123-91-1, 2.5%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
This material contains 1,2-Butylene oxide (CAS# 106-88-7, 0.47%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 71-55-6 is listed as a hazardous air pollutant (HAP).
CAS# 123-91-1 is listed as a hazardous air pollutant (HAP).
CAS# 106-88-7 is listed as a hazardous air pollutant (HAP).
CAS# 71-55-6 is listed as a Class 1 ozone depletor with an 0.1 ODP; 110 GWP
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# 71-

55-6 is listed as a Priority Pollutant under the Clean Water Act. CAS# 71-55-6 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

CAS# 75-52-5 is considered highly hazardous by OSHA.

STATE

CAS# 71-55-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 123-91-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 106-88-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 75-52-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

WARNING: This product contains 1,4-Dioxane, a chemical known to the state of California to cause cancer.
WARNING: This product contains Nitromethane, a chemical known to the state of California to cause cancer.
California No Significant Risk Level: CAS# 123-91-1: 30 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN N

Risk Phrases:

R 20 Harmful by inhalation.
R 59 Dangerous for the ozone layer.

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.
S 59 Refer to manufacturer/supplier for information on recovery/recycling.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 71-55-6: 3
CAS# 123-91-1: 2
CAS# 106-88-7: 3
CAS# 75-52-5: 2

Canada - DSL/NDSL

CAS# 71-55-6 is listed on Canada's DSL List.
CAS# 123-91-1 is listed on Canada's DSL List.
CAS# 106-88-7 is listed on Canada's DSL List.
CAS# 75-52-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D1B, D2B.
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# 71-55-6 is listed on the Canadian Ingredient Disclosure List.
CAS# 123-91-1 is listed on the Canadian Ingredient Disclosure List.
CAS# 75-52-5 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/11/1999
Revision #5 Date: 3/16/2007

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.

SAFETY DATA SHEET

Santa Cruz Biotechnology, Inc.
Revision date 23-Mar-2017
Version 1.1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name	Aldrin
Product Code	SC-239202

Recommended use of the chemical and restrictions on use

For research use only. Not intended for diagnostic or therapeutic use.

Details of the supplier of the safety data sheet

Santa Cruz Biotechnology, Inc.
10410 Finnell Street
Dallas, TX 75220
831.457.3800
800.457.3801
scbt@scbt.com

Emergency telephone number

Chemtrec
1.800.424.9300 (Within USA)
+1.703.527.3887 (Outside USA)

2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification

Acute toxicity - Oral	Category 2
Acute toxicity - Dermal	Category 1
Acute toxicity - Inhalation (Dusts/Mists)	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (repeated exposure)	Category 1

Label elements

Signal word: Danger

Hazard statements:
Fatal if swallowed
Fatal in contact with skin
Fatal if inhaled
May cause cancer
Causes damage to organs through prolonged or repeated exposure

Symbols/Pictograms

Precautionary Statements - Prevention:
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not get in eyes, on skin, or on clothing
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection

Precautionary Statements - Response	IF exposed or concerned: Get medical advice/attention IF ON SKIN: Gently wash with plenty of soap and water Immediately call a POISON CENTER or doctor/physician Remove/Take off immediately all contaminated clothing Wash contaminated clothing before reuse IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Immediately call a POISON CENTER or doctor/physician IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician Rinse mouth
Precautionary Statements - Storage	Store locked up Store in a well-ventilated place. Keep container tightly closed
Precautionary Statements - Disposal	Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Hazards not otherwise classified (HNOC)	Not applicable

Other Information

NFPA	Health hazards	4		**HMIS**	Health hazards	4
	Flammability	0			Flammability	0
	Stability	0			Physical hazards	0
	Physical and chemical properties	-			Personal protection	-

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS No	309-00-2
Molecular Weight	364.91
Formula	$C_{12}H_8Cl_6$

Chemical Name	CAS No	Weight %	Oral LD50	Dermal LD50	Inhalation LC50
Aldrin	309-00-2	>98	= 39 mg/kg (Rat) = 38 mg/kg (Rat)	= 150 mg/kg (Rabbit) = 15 mg/kg (Rabbit) = 98 mg/kg (Rat)	-

4. FIRST AID MEASURES

First Aid Measures

General advice	Immediate medical attention is required.
Eye contact	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Call a physician immediately.
Skin Contact	Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.
Inhalation	Immediate medical attention is required Remove to fresh air If not breathing, give artificial respiration Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. Drink plenty of water.
Self-protection of the first aider	Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Symptoms	No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable Extinguishing Media	None.

Specific hazards arising from the chemical

Specific hazards arising from the chemical	Thermal decomposition can lead to release of toxic/corrosive gases and vapors.
Hazardous combustion products	Carbon oxides. Phosgene.

Explosion data

Sensitivity to Mechanical Impact	No information available.
Sensitivity to Static Discharge	No information available.

Protective equipment and precautions for firefighters

Protective equipment and precautions for firefighters	Wear self-contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	Use personal protective equipment as required. Keep people away from and upwind of spill/leak.

Environmental precautions

Environmental precautions	Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional Ecological Information. Should not be released into the environment.

Methods and material for containment and cleaning up

Methods for containment	Prevent further leakage or spillage if safe to do so. Cover powder spill with plastic sheet or tarp to minimize spreading. Dike far ahead of liquid spill for later disposal.
Methods for cleaning up	Use personal protective equipment as required. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically, placing in appropriate containers for disposal. Avoid creating dust. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling	Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wash contaminated clothing before reuse. Do not breathe dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. Thermal decomposition can lead to release of toxic/corrosive gases and vapors.

Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Store at room temperature.

Incompatible materials	None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines	.
Other Information	Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Aldrin 309-00-2	TWA: 0.05 mg/m^3 inhalable fraction and vapor S*	TWA: 0.25 mg/m^3 (vacated) TWA: 0.25 mg/m^3 (vacated) S* S*	IDLH: 25 mg/m^3 TWA: 0.25 mg/m^3

NIOSH IDLH Immediately Dangerous to Life or Health

Appropriate engineering controls

Engineering Controls	Showers Eyewash stations Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection	Tight sealing safety goggles.
Skin and Body Protection	Wear protective gloves and protective clothing.
Respiratory protection	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
General Hygiene Considerations	When using do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Wash hands thoroughly after handling. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	No information available
Odor	No information available

Property	**Values**
pH	No information available
Melting point/freezing point	104 °C
Boiling point	145 °C
Flash point	No information available
Density	1.6 g/cm^3
Evaporation rate	No information available
Upper flammability limits	No information available
Lower flammability limit	No information available
Vapor pressure	No information available
Vapor density	No information available
Specific gravity	1.65
Water solubility	No information available
Solubility in other solvents	No information available
Partition coefficient	6.5
Autoignition temperature	No information available
Decomposition temperature	No information available
Kinematic viscosity	No information available

Explosive properties	No information available
Oxidizing properties	No information available

10. STABILITY AND REACTIVITY

Reactivity	Not applicable
Chemical stability	Stable under recommended storage conditions.
Possibility of Hazardous Reactions	None under normal processing.
Hazardous polymerization	No information available.
Conditions to avoid	Extremes of temperature and direct sunlight.
Incompatible materials	Strong oxidizing agents.
Hazardous Decomposition Products	Carbon oxides. Phosgene.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	No data available.
Eye contact	No data available.
Skin Contact	No data available.
Ingestion	No data available.

Information on toxicological effects

Symptoms	No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity	Prolonged or repeated exposure increases the risk. Possible risk of irreversible effects. May cause adverse liver effects.
Target Organ Effects	Central nervous system, Kidney, Liver, Lungs, Skin, Thyroid.
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Aldrin 309-00-2	A3	Group 2A Group 3	-	X

ACGIH (American Conference of Governmental Industrial Hygienists) A3 - Animal Carcinogen
IARC (International Agency for Research on Cancer) Group 2A - Probably Carcinogenic to Humans
Not classifiable as a human carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor) X - Present

Numerical measures of toxicity - Product Information

Unknown acute toxicity	No information available

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	5 mg/kg
ATEmix (dermal)	5 mg/kg
ATEmix (inhalation-dust/mist)	0 mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity	May cause long lasting harmful effects to aquatic life

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Persistence and degradability	No information available.
Bioaccumulation	No information available.
Mobility	No information available.

Chemical Name	Partition coefficient
Aldrin 309-00-2	5.11

13. DISPOSAL CONSIDERATIONS

Disposal of wastes	Disposal should be in accordance with applicable regional, national and local laws and regulations. Should not be released into the environment.
Contaminated packaging	Do not reuse container.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used.
US EPA Waste Number	P004
California Hazardous Waste Status	This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Aldrin 309-00-2	Toxic

14. TRANSPORT INFORMATION

DOT

UN/ID no	UN2811
Hazard Class	6.1
Packing Group	II
Proper shipping name	Toxic solids, organic, n.o.s.
Description	UN2811, Toxic solids, organic, n.o.s. (Aldrin), 6.1, II, Marine pollutant, POISON
Marine pollutant	This product contains a chemical which is listed as a severe marine pollutant according to DOT
Emergency Response Guide Number	154

IMDG

UN/ID no	UN2811
Hazard Class	6.1
Packing Group	II
Proper shipping name	Toxic solid, organic, n.o.s.
Description	UN2811, Toxic solid, organic, n.o.s. (Aldrin), 6.1, II, Marine pollutant
Special Provisions	274
EmS-No	F-A, S-A
Marine pollutant	This product contains a chemical which is listed as a marine pollutant according to IMDG/IMO

IATA

UN/ID no	UN2811
Hazard Class	6.1
Packing Group	II
Proper shipping name	Toxic solid, organic, n.o.s.
Description	UN2811, Toxic solid, organic, n.o.s. (Aldrin), 6.1, II

15. REGULATORY INFORMATION

International Inventories

All of the components in the product are on the following Inventory lists

Europe (EINECS/ELINCS/NLP) Australia (AICS) South Korea (KECL): ENCS (Japan): Philippines (PICCS)

Chemical Name	TSCA	DSL	NDSL	EINECS	ELINCS	ENCS	IECSC	KECL	PICCS	AICS
Aldrin	-	-	-	X	-	X	-	X	X	X

X - Listed
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Aldrin 309-00-2	1 lb	X	X	X

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals.

Chemical Name	California Proposition 65
Aldrin - 309-00-2	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Aldrin 309-00-2	X	X	X

16. OTHER INFORMATION

Revision note No information available

Disclaimer
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

Vinyl Chloride

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Vinyl Chloride

Chemical name : vinyl chloride

Other means of identification : chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro- (vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC

SDS # : 001067

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas
CARCINOGENICITY - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May cause frostbite
May displace oxygen and cause rapid suffocation.
May cause cancer.
May cause damage to organs through prolonged or repeated exposure. (liver)

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not breathe gas.

Section 2. Hazards identification

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Store locked up. Protect from sunlight. Store in a well-ventilated place.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : vinyl chloride

Other means of identification : chloroethylene; Ethene, chloro-; Chloroethene; Vinyl chloride, monomer; Ethene, chloro-(vinyl chloride); Vinyl chloride monomer; Monochloroethylene; Monochloroethene; Ethylene monochloride; VCM; VC

Product code : 001067

CAS number/other identifiers

CAS number : 75-01-4

Ingredient name	%	CAS number
vinyl chloride	100	75-01-4

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not breathe gas. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Store locked up. Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
vinyl chloride	**ACGIH TLV (United States, 3/2017).** TWA: 1 ppm 8 hours. **OSHA PEL (United States, 6/2016).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Section 8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -153.8°C (-244.8°F)

Boiling point : -13.4°C (7.9°F)

Critical temperature : 158.45°C (317.2°F)

Flash point : Closed cup: -78°C (-108.4°F)
Open cup: -78°C (-108.4°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 3.8%
Upper: 29.3%

Section 9. Physical and chemical properties

Vapor pressure : Not available.

Vapor density : 2.2 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.25

Gas Density (lb/ft ^{3}) : 0.16129 (21.1°C / 70 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 1.1 g/l

Partition coefficient: n-octanol/water : 1.38

Auto-ignition temperature : 472°C (881.6°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 62.5 g/mole

Aerosol product

Heat of combustion : -18924336 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Section 11. Toxicological information

Classification

Product/ingredient name	OSHA	IARC	NTP
vinyl chloride	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
vinyl chloride	Category 2	Not determined	liver

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Section 11. Toxicological information

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
vinyl chloride	1.38	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Vinyl chloride; Ethene, chloro-	75-01-4	Listed	U043

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1086	UN1086	UN1086	UN1086	UN1086
UN proper shipping name	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED	VINYL CHLORIDE, STABILIZED

Section 14. Transport information

Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Reportable quantity** 1 lbs / 0.454 kg. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
Limited quantity Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 21, B44, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Road or Rail Index Forbidden

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined
Clean Water Act (CWA) 307: vinyl chloride
Clean Air Act (CAA) 112 regulated flammable substances: vinyl chloride

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

Section 15. Regulatory information

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	vinyl chloride	75-01-4	100
Supplier notification	vinyl chloride	75-01-4	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

⚠ **WARNING**: This product can expose you to Vinyl chloride, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Vinyl chloride	Yes.	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): This material is listed or exempted.

Malaysia : This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Thailand : Not determined.

Turkey : This material is listed or exempted.

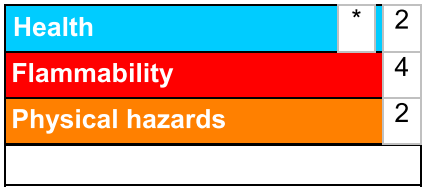
Section 15. Regulatory information

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

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

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1	Expert judgment
GASES UNDER PRESSURE - Liquefied gas	Expert judgment
CARCINOGENICITY - Category 1	Expert judgment
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (liver) - Category 2	Expert judgment

History

Date of printing : 7/9/2018

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Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Section 16. Other information

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Version 6.3
Revision Date 09/14/2021
Print Date 07/21/2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Dieldrin

Product Number : 291218
Brand : Aldrich
Index-No. : 602-049-00-9
CAS-No. : 60-57-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 2), H300
Acute toxicity, Dermal (Category 1), H310
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word	Danger
Hazard statement(s)	
H300 + H310	Fatal if swallowed or in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P302 + P350 + P310	IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene
Formula	:	$C_{12}H_8Cl_6O$
Molecular weight	:	380.91 g/mol
CAS-No.	:	60-57-1
EC-No.	:	200-484-5
Index-No.	:	602-049-00-9

Component	Classification	Concentration
Dieldrin		
	Acute Tox. 2; Acute Tox. 1; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H310, H351, H372, H400, H410 M-Factor - Aquatic Acute: 100	<= 100 %

	M-Factor - Aquatic Chronic: 100	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Consult a physician. Show this material safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.**Advice on safe handling**
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Advice on protection against fire and explosion
Provide appropriate exhaust ventilation at places where dust is formed.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place.

Storage class
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dieldrin	60-57-1	TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.25 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen Potential for dermal absorption		
		TWA	0.25 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		TWA	0.25 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		PEL	0.25 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 143 - 144 °C (289 - 291 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 38.3 mg/kg
Inhalation: No data available
Dermal: No data available
LD50 Dermal - 5 mg/kg
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.
Limited evidence of carcinogenicity in animal studies

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.**Aspiration hazard**
No data available

11.2 Additional Information

RTECS: IO1750000
Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood - Irregularities - Based on Human Evidence

Blood - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	mortality LC50 - Carassius auratus (goldfish) - 1.6 µg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 79.5 µg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)
Reportable Quantity (RQ): 1 lbs
1) Marine pollutant: yesPoison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Marine pollutant : yes

IATA
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Dieldrin)
IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-02-16

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.3 Revision Date: 09/14/2021 Print Date: 07/21/2022

SAFETY DATA SHEET

Creation Date 20-Aug-2014 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Mercury (Certified ACS)**

Cat No. : **M141-1LB; M141-6LB**

Synonyms Colloidal mercury; Hydrargyrum; Metallic mercury

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute Inhalation Toxicity - Vapors	Category 2
Reproductive Toxicity	Category 1B
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Central nervous system (CNS), Kidney.	

Label Elements

Signal Word
Danger

Hazard Statements
Fatal if inhaled
May damage the unborn child
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Mercury	7439-97-6	100

4. First-aid measures

General Advice
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation
Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion
Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects
None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. approved class D extinguishers.

Unsuitable Extinguishing Media Water may be ineffective

Flash Point Not applicable
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Very toxic. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Keep product and empty container away from heat and sources of ignition. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Mercury oxide. Toxic fumes.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. No special precautions required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Should not be released into the environment. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Pick up and transfer to properly labelled containers.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Keep in a dry place. Keep away from acids. Incompatible Materials. Strong oxidizing agents. Ammonia. Metals. Halogens.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Mercury	TWA: 0.025 mg/m³ Skin	(Vacated) TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³ (Vacated) STEL: 0.03 mg/m³ Skin (Vacated) Ceiling: 0.1 mg/m³	IDLH: 10 mg/m³ TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³	TWA: 0.025 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. None under normal use conditions.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No special protective equipment required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-38.87 °C / -38 °F
Boiling Point/Range	356.72 °C / 674.1 °F
Flash Point	Not applicable
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	0.002 mmHg @ 25 °C
Vapor Density	7.0
Specific Gravity	13.59 (H2O=1)
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Hg
Molecular Weight	200.59

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Ammonia, Metals, Halogens

Hazardous Decomposition Products Mercury oxide, Toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Mercury	Not listed	Not listed	LC50 < 27 mg/m^3 (Rat) 2 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Mercury	7439-97-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects May cause harm to the unborn child.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure Central nervous system (CNS) Kidney

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Mercury	Not listed	0.9 mg/L LC50 96h	Not listed	Not listed

		0.18 mg/L LC50 96h 0.16 mg/L LC50 96h 0.5 mg/L LC50 96h		

Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Mercury - 7439-97-6	U151	-

14. Transport information

DOT

UN-No UN2809
Proper Shipping Name Mercury
Hazard Class 8
Subsidiary Hazard Class 6.1
Packing Group III

TDG

UN-No UN2809
Proper Shipping Name Mercury
Hazard Class 8
Subsidiary Hazard Class 6.1
Packing Group III

IATA

UN-No UN2809
Proper Shipping Name Mercury
Hazard Class 8
Subsidiary Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN2809
Proper Shipping Name Mercury
Hazard Class 8
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Mercury	7439-97-6	X	ACTIVE	S;12C

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule.

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Mercury	7439-97-6	Section 5

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Mercury	7439-97-6	X	-	231-106-7	X	X		X	X	KE-23117

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Mercury	7439-97-6	100	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Mercury	-	-	X	X

Clean Air Act

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Mercury	1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Mercury	7439-97-6	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Mercury	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV -	REACH (1907/2006) - Annex XVII -	REACH Regulation (EC

	Substances Subject to Authorization	Restrictions on Certain Dangerous Substances	1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Mercury	-	Use restricted. See item 18[a]. (see link for restriction details) Use restricted. See item 30. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Mercury	7439-97-6	Listed	Not applicable	Not applicable	0.1% (Max. Conc.)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Mercury	7439-97-6	Not applicable	Not applicable	X	Annex I - Y29

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 20-Aug-2014
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 10-December-2009 **Revision Date** 24-December-2021 **Revision Number** 6

1. Identification

Product Name **Tetrachloroethylene**

Cat No. : **C182-20; C182-4**

CAS-No 127-18-4
Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Importer/Distributor
Fisher Scientific
112 Colonnade Road,
Ottawa, ON K2E 7L6,
Canada
Tel: 1-800-234-7437

Manufacturer
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

WHMIS 2015 Classification Classified as hazardous under the Hazardous Products Regulations (SOR/2015-17)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements

Causes skin irritation
May cause an allergic skin reaction
Causes serious eye irritation
May cause drowsiness and dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fumes/gas/mist/vapours/spray
Wash face, hands and any exposed skin thoroughly after handling
Use only outdoors or in a well-ventilated area
Contaminated work clothing should not be allowed out of the workplace
Response
IF exposed or concerned: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
IF INHALED: Remove person to fresh air and keep comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Take off contaminated clothing
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant

Other Hazards
Toxic to aquatic life with long lasting effects

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms/effects None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products
Chlorine. Phosgene. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight. Incompatible Materials. Strong acids. Strong oxidizing agents. Strong bases. Metals. Zinc. Amines. Aluminium.

8. Exposure controls / personal protection

Exposure Guidelines

Component	Alberta	British Columbia	Ontario TWAEV	Quebec	ACGIH TLV	OSHA PEL	NIOSH IDLH
Tetrachloroethylene	TWA: 25 ppm	TWA: 25 ppm	TWA: 25 ppm	TWA: 25 ppm	TWA: 25 ppm	(Vacated) TWA:	IDLH: 150 ppm

	TWA: 170 mg/m³ STEL: 100 ppm STEL: 678 mg/m³	STEL: 100 ppm	STEL: 100 ppm	TWA: 170 mg/m³ STEL: 100 ppm STEL: 685 mg/m³	STEL: 100 ppm	25 ppm (Vacated) TWA: 170 mg/m³ Ceiling: 200 ppm TWA: 100 ppm	

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles

Hand Protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Glove material	Breakthrough time	Glove thickness	Glove comments
Nitrile rubber	> 480 minutes	0.38 mm	As tested under EN374-3
Viton (R)	> 480 minutes	0.3 mm	Determination of Resistance to Permeation by Chemicals

Inspect gloves before use. observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information) gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion. gloves with care avoiding skin contamination.

Respiratory Protection

When workers are facing concentrations above the exposure limit they must use appropriate certified 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.

To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Recommended Filter type: Organic gases and vapours filter Type A Brown conforming to EN14387

When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls

Prevent product from entering drains. Do not allow material to contaminate ground water system.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)

Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C
Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C2 Cl4
Molecular Weight	165.83

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water.

Incompatible Materials Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium

Hazardous Decomposition Products Chlorine, Phosgene, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

IARC (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)	*A1 - Known Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Animal Carcinogen*
Mexico - Occupational Exposure Limits - Carcinogens	*ACGIH: (American Conference of Governmental Industrial Hygienists)* *Mexico - Occupational Exposure Limits - Carcinogens* *A1 - Confirmed Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Confirmed Animal Carcinogen* *A4 - Not Classifiable as a Human Carcinogen* *A5 - Not Suspected as a Human Carcinogen*

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No	UN1897
Proper Shipping Name	TETRACHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

TDG

UN-No	UN1897
Proper Shipping Name	TETRACHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

IATA

UN-No	UN1897
Proper Shipping Name	TETRACHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	UN1897
Proper Shipping Name	TETRACHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

15. Regulatory information

International Inventories

Component	CAS-No	DSL	NDSL	TSCA	TSCA Inventory notification - Active-Inactive	EINECS	ELINCS	NLP
Tetrachloroethylene	127-18-4	X	-	X	ACTIVE	204-825-9	-	-

Component	CAS-No	IECSC	KECL	ENCS	ISHL	TCSI	AICS	NZIoC	PICCS
Tetrachloroethylene	127-18-4	X	KE-33294	X	X	X	X	X	X

Legend:
X - Listed '-' - Not Listed
KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

Canada

SDS in compliance with provisions of information as set out in Canadian Standard - Part 4, Schedule 1 and 2 of the Hazardous Products Regulations (HPR) and meets the requirements of the HPR (Paragraph 13(1)(a) of the Hazardous Products Act (HPA)).

Component	Canada - National Pollutant Release Inventory (NPRI)	Canadian Environmental Protection Agency (CEPA)	Canada's Chemicals Management Plan (CEPA)

		- List of Toxic Substances	
Tetrachloroethylene	Part 1, Group A Substance Part 4 Substance	Schedule I	

Other International Regulations

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Tetrachloroethylene	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS-No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Tetrachloroethylene	127-18-4	Listed	Not applicable	Not applicable	Not applicable

Component	CAS-No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Tetrachloroethylene	127-18-4	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 10-December-2009
Revision Date 24-December-2021
Print Date 24-December-2021
Revision Summary This document has been updated to comply with the requirements of WHMIS 2015 to align with the Globally Harmonised System (GHS) for the Classification and Labelling of Chemicals.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Toluene, Reagent Grade

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Toluene, Reagent Grade**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25611**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:

Flammable
Flammable liquids, category 2

Irritant
Skin irritation, category 2
Specific target organ toxicity following single exposure, category 3

Health hazard
Reproductive toxicity, category 2
Specific target organ toxicity following repeated exposure, category 2
Aspiration hazard, category 2

Flam. Liq. 2
Skin Irrit. 2
Repr. 2
STOT SE 3, Central nervous system
STOT RE 2
Asp. Tox. 1
Aquatic Acute 2

Signal word :Danger

Hazard statements:
Highly flammable liquid and vapour
May be harmful if swallowed and enters airways
Causes skin irritation
May cause drowsiness or dizziness
Suspected of damaging fertility or the unborn child
May cause damage to organs through prolonged or repeated exposure
Toxic to aquatic life

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Obtain special instructions before use
Wash skin thoroughly after handling
Use only outdoors or in a well-ventilated area
Avoid release to the environment
Wear protective gloves/protective clothing/eye protection/face protection
Do not handle until all safety precautions have been read and understood
Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/light/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Do not breathe dust/fume/gas/mist/vapours/spray
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF exposed or concerned: Get medical advice/attention
Specific treatment (see supplemental first aid instructions on this label)
Do NOT induce vomiting
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
In case of fire: Use agents recommended in section 5 for extinction
Store in a well ventilated place. Keep container tightly closed
Store in a well ventilated place. Keep cool
Store locked up
Dispose of contents and container to an approved waste disposal plant

Other Non-GHS Classification:

WHMIS

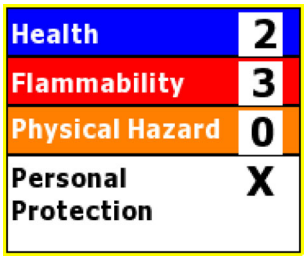
B2 

D2A 

D2B 

NFPA/HMIS

NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:
Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed to fresh air. Give artificial respiration if necessary. If breathing is difficult give oxygen.Loosen clothing and place exposed in a comfortable position.Seek immediate medical attention.

After skin contact: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

After eye contact: Protect unexposed eye.Flush exposed eye gently using water for 15-20 minutes. Remove contact lenses while rinsing.IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

After swallowing: Rinse mouth with water.Never give anything by mouth to an unconscious person.DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

Most important symptoms and effects, both acute and delayed:

Irritation.Shortness of breath.Headache.Nausea.Dizziness.The substance is irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels could cause cardiac dysrhythmia and unconsciousness.;The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention provide SDS document to physician. Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use foam, dry chemical, or carbon dioxide.

For safety reasons unsuitable extinguishing agents: Solid streams of water may spread fire.

Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.Vapors may ignited and cause explosion if in confined space. Vapors can flow across ignition source and flashback.

Advice for firefighters:

Protective equipment: Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Additional information (precautions): Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.Cool closed containers exposed to fire with water spray.Approach fire from upwind to avoid hazardous vapors and toxic decomposition. If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped or safely confined. Use water in flooding quantities as fog. Solid streams of water may spread fire. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.Ensure that air-handling systems are operational. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.Remove all sources of ignition.

Environmental precautions:

Should not be released into environment.Prevent from reaching drains, sewer, or waterway.

Methods and material for containment and cleaning up:

Wear protective eyeware, gloves, and clothing. Refer to Section 8.Always obey local regulations.If necessary use trained response staff or contractor. Evacuate personnel to safe areas. Containerize for disposal. Refer to Section 13.Keep in suitable closed containers for disposal.Remove all sources of ignition.Have extinguishing agent available in case of fire. Use non-sparking equipment.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Avoid contact with skin, eyes, and clothing.Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Follow proper disposal methods. Refer to Section 13.Do not eat, drink, smoke, or use personal products when handling chemical substances.Use explosion-proof equipment.Keep away from open flames, hot surfaces and sources of ignition.

Conditions for safe storage, including any incompatibilities:

Store in a cool location.Keep away from food and beverages.Protect from freezing and physical damage.Provide ventilation for containers. Keep container tightly sealed. Store away from incompatible materials. Store as flammable. Keep away from sources of ignition.

SECTION 8 : Exposure controls/personal protection



Control Parameters:	108-88-3 , Toluene, ACGIH TLV TWA 20 ppm 108-88-3, Toluene, OSHA PEL TWA 200 ppm
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.Use under a chemical fume hood.Use explosion-proof equipment.

Respiratory protection:	Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls.When necessary use NIOSH approved breathing equipment. Use under a chemical fume hood.
Protection of skin:	Select glove material impermeable and resistant to the substance.Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves.Wear protective clothing.
Eye protection:	Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).Safety glasses or goggles are appropriate eye protection.
General hygienic measures:	Perform routine housekeeping.Wash hands before breaks and immediately after handling the product.Avoid contact with skin, eyes, and clothing.Before rewearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear, colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	7 %(V) 1.2 %(V)
Odor:	Sweet, pungent, benzene-like odor.	**Vapor pressure**:	28.4 mm Hg @ 25 deg C
Odor threshold:	1.03 to 140 ug/cu m	**Vapor density**:	3.1
pH-value:	Not Determined	**Relative density**:	0.865 g/mL at 25 °C (77 °F)
Melting/Freezing point:	95°C (-139°F)	**Solubilities**:	Insoluble in water
Boiling point/Boiling range:	110 - 111 °C (230 - 232 °F)	**Partition coefficient (n-octanol/water)**:	log Kow 2.73
Flash point (closed cup):	4.0 °C (39.2 °F)	**Auto/Self-ignition temperature**:	535.0 °C (995.0 °F)
Evaporation rate:	2.4	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Highly flammable	**Viscosity**:	a. Kinematic:Not determined b. Dynamic: Not Determined
Density: Not Determined			

SECTION 10 : Stability and reactivity

Reactivity: Nonreactive under normal conditions.Reacts violently with strong oxidants. This generates fire and explosion hazard.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing.Vapours may form explosive mixture with air.
Conditions to avoid: Incompatible materials.excess heat.Direct Sunlight
Incompatible materials: Oxidizing agents. Acids.

Hazardous decomposition products: Carbon oxides.

SECTION 11 : Toxicological information

Acute Toxicity:		
Dermal:	108-88-3 (Toluene)	LD50 Rabbit: 12,124 mg/kg
Oral:	108-88-3 (Toluene)	LD50 Rat: 5000mg/kg
Inhalation:	108-88-3 (Toluene)	LC50 Rat: 12,500 - 28,800 mg/m3/4 h
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Dermal:	108-88-3 (Toluene)	Rabbit: Skin Irritation - 24 h
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		IARC:: Group 3: Not classifiable as to its carcinogenicity to humans (Toluene)
Mutagenicity:		rat Liver DNA damage
Reproductive Toxicity:		Suspected human reproductive toxicant. rat - Inhalation Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).rat - Oral Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

SECTION 12 : Ecological information

Ecotoxicity

Fish LC50 - Oncorhynchus mykiss (rainbow trout) - 7.63 mg/l - 96 h: 108-88-3 (Toluene)

Invertebrates EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h: 108-88-3 (Toluene)

Persistence and degradability: Readily biodegradable
Bioaccumulative potential: bioconcentration in aquatic organisms is low to moderate
Mobility in soil: toluene is expected to have high to moderate mobility in soil.2.65 log Pow
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Contact a licensed professional waste disposal service to dispose of this material.Dispose of empty containers as unused product.Product or containers must not be disposed together with household garbage. It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations. Ensure complete and accurate classification.

SECTION 14 : Transport information

UN-Number

1294

UN proper shipping name

Toluene

Transport hazard class(es)

Class:
3 Flammable liquids

Packing group:II
Environmental hazard:
Transport in bulk:
Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

Acute, Chronic, Fire

SARA Section 313 (Specific toxic chemical listings):

None of the ingredients is listed

RCRA (hazardous waste code):

108-88-3 Toluene - U220

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

108-88-3 Toluene 1000 lb

Proposition 65 (California):

Chemicals known to cause cancer:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed

Chemicals known to cause developmental toxicity:

108-88-3 Toluene

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

108-88-3 Toluene

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations. Note: . The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:

Effective date : 01.31.2015
Last updated : 03.19.2015

SAFETY DATA SHEET

Creation Date 03-Feb-2010 **Revision Date** 24-Dec-2021 **Revision Number** 3

1. Identification

Product Name **Trichloroethylene**

Cat No. : **T340-4; T341-4; T341-20; T341-500; T403-4**

CAS No 79-01-6
Synonyms Trichloroethene (Stabilized/Technical/Electronic/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against .

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
Suspected of causing genetic defects
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Trichloroethylene	79-01-6	>95

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	410 °C / 770 °F
Explosion Limits	
Upper	44.8 vol %
Lower	8 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Chlorine. Phosgene. Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
Environmental Precautions	Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers. Incompatible Materials. Strong oxidizing agents. Strong bases. Amines. Alkali metals. Metals. .

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m³ Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m³ TWA: 100 ppm	IDLH: 1000 ppm	TWA: 10 ppm STEL: 25 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection 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.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-85 °C / -121 °F
Boiling Point/Range	87 °C / 188.6 °F
Flash Point	No information available
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)

Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	44.8 vol %
Lower	8 vol %
Vapor Pressure	77.3 mbar @ 20 °C
Vapor Density	4.5 (Air = 1.0)
Specific Gravity	1.460
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	410 °C / 770 °F
Decomposition Temperature	> 120°C
Viscosity	0.55 mPa.s (25°C)
Molecular Formula	C2 H Cl3
Molecular Weight	131.39

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Light sensitive.

Conditions to Avoid Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,

Hazardous Decomposition Products Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4920 mg/kg (Rat)	LD50 = 29000 mg/kg (Rabbit)	LC50 = 26 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Trichloroethylene	79-01-6	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mutagenic Effects Mutagenic effects have occurred in humans.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Heart spleen Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is:. Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 450 mg/L, 96h (Desmodesmus subspicatus)	LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas) LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Trichloroethylene	2.4

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Trichloroethylene - 79-01-6	U228	-

14. Transport information

DOT

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1

Packing Group III

TDG

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IATA

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Trichloroethylene	79-01-6	X	ACTIVE	R;S

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Trichloroethylene	79-01-6	Section 5 Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Trichloroethylene	79-01-6	X	-	201-167-4	X	X	X	X	X	X

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Trichloroethylene	79-01-6	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Trichloroethylene	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors

Trichloroethylene	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Trichloroethylene	100 lb 1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Trichloroethylene	Carcinogenic Category 1B Article 57 Application date: October 21, 2014 Sunset date: April 21, 2016 Exemption - None	Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - 201-167-4 - Carcinogenic, Article 57a

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Trichloroethylene	79-01-6	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive	Seveso III Directive	Rotterdam	Basel Convention

		(2012/18/EC) - Qualifying Quantities for Major Accident Notification	(2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Convention (PIC)	(Hazardous Waste)
Trichloroethylene	79-01-6	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

APPENDIX F

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN (QAPP)

For

SITE MANAGEMENT PLAN

1801 Falmouth Avenue
New Hyde Park, NY

NYSDEC SITE #130211

Prepared for:

Seaboard Estates, Inc.
c/o Beveridge & Diamond, LLC
477 Madison Avenue, 15th Floor
New York, NY 10022-5802

and

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12207

Prepared by:

CA RICH Geology Services, D.P.C.
17 Dupont Street
Plainview, NY 11803-1614

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Quality Assurance Project Plan

1.1 Introduction - The following Quality Assurance Project Plan ("QAPP") has been prepared specifically for the Site Management Plan (SMP) in connection with the Former Zoe Chemical Site cleanup under the NYSDEC Site Number 130211. This Plan was prepared and approved as stated below.

Jason T. Cooper

Prepared by: _____ Date: 7/26/22

Jason Cooper, Quality Assurance Officer

Jessica Proscia

Approved by: _____ Date: 7/26/22

Jessica Proscia., Senior Project Manager

1.2 Project Description - The SMP subject to this QAPP has been prepared to address the following issues:

- Remove the VOCs from the subsurface soils and soil vapor via an active Soil Vapor Extraction (SVE) system.

The methods that will be used include the continuous operation of the SVE system.

1.3 Project Organization – Jessica Proscia will serve as the Senior Project Manager (PM) and will be responsible for the overall scheduling and performance of all investigative activities.

Jason Cooper will serve as the Quality Assurance Officer (QAO) for this project. His duties will include:

- Review of laboratory data packages
- Interface with laboratory
- Performance of Field Audits

Experienced CA RICH staff will perform and/or oversee completion of all the field activities described in the SMP.

1.4 Quality Assurance Objectives and Data Measurement

Chemical Analysis – All environmental samples will be delivered to a New York State-Certified laboratory contracted to CA RICH for chemical analysis. This data is intended to determine the potential for soil vapor to contain detectable concentrations of VOCs. Soil vapor will be chemically analyzed utilizing the procedures and protocols described in Sampling, Sample Preparation, & Analysis Requirements of EPA Compendium Method T0-15. Each stainless-steel SUMMA air

sampling canister required for analysis utilizing EPA Method T0-15 will be specially pre-calibrated and prepared for the requisite six liter sampling volumes.

Quality assurance objectives are generally defined in terms of five parameters:

- **Representativeness -** Representativeness is the degree to which sampling data accurately and precisely represents site conditions, and is dependent on sampling and analytical variability. The SMP has been designed to assess the presence of the constituents in the target media at the time of sampling. The Plan presents the rationale for sample quantities and location. The Plan also presents field sampling methodologies and laboratory analytical methodologies.

  The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data. Further discussion of QC checks is presented in Section 1.11.

- **Comparability** - Comparability is the degree of confidence with which one data set can be compared to another data set. Comparability between this investigation and to the extent possible, with existing data will be maintained through consistent sampling and analytical methodology set forth in the QAPP; the SMP; the NYSDEC ASP analytical methods (2005) with NYSDEC ASP QA/QC requirements (2005); and through use of QA/QC procedures and appropriately trained personnel.

- **Completeness -** Completeness is defined as a measure of the amount of valid data obtained from a sampling event compared to the amount that was expected to be obtained under normal conditions. This will be determined upon assessment of the analytical results.

- **Precision -** Precision is the measure of reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the SMP. To maximize precision, sampling and analytical procedures will be followed. All work for the investigation phase of this project will adhere to established protocols presented in the QAPP, and the SMP. Checks for analytical precision will include the analysis of matrix spike duplicated, laboratory duplicates, and field duplicates. Checks for field measurement precision will include obtaining duplicate field measurements. Further discussion of precision QC checks is provided in Section 1.11.

- **Accuracy** - Accuracy is the deviation of a measurement from the true value of a known standard. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, internal standards, matrix spikes, blank spikes, and surrogates (e.g. system monitoring compounds) will be used to assess the accuracy of the laboratory analytical data.

1.5 Sampling Procedures - The sampling procedures that will be employed are discussed in detail in the SMP.

1.6 Sample and Document Custody Procedures

- **General** - The Chain-of-Custody program allows for the tracing of possession and handling of the sample from its time of collection through its chemical analysis in the laboratory. The chain-of-custody program at this site will include:

  - Sample labels
  - Chain-of-Custody records
  - Field records

- **Sample Container Details**

Sample Matrix & Parameters	Container & Preservation	Method	Holding Time*
Soil Vapor			
Raw Air Sample for VOCs	One 6-liter SUMMA Canister	USEPA TO-15	30 days
Effluent Air Sample for VOCs	One 6-liter SUMMA Canister	USEPA TO-15	30 days

*Holding Time is calculated from collection date

- **Sample Labels** - To prevent misidentification of samples, a label will be affixed to the sample container and will contain the following information:

  - Site Name
  - Sample identification number
  - Date and time of collection
  - Initials of Sampler
  - Preservation (if any)
  - Type of analysis to be conducted.

- **Chain-of-Custody Records** - To establish the documentation necessary to trace sample possession from the time of collection, a chain-of-custody record will be filled out and will accompany samples at all times. The record will contain the following information:

  - Project name:
  - Printed name and signature of samplers
  - Sample Identification
  - Date and time of collection
  - Sampling location
  - Number of containers for each sample
  - Signature of individuals involved in sample transfer (when relinquishing and accepting samples)
  - Inclusive dates and times of possession.

- **Field Records** - Field records will be maintained during each sampling effort in a logbook. All aspects of sample collection, handling and visual observations will be recorded. All sample collection equipment, field analytical equipment and equipment utilized to make physical measurements will be identified in the field logbook.

All calculations, results and calibration data for field sampling, field analytical and field physical measurement equipment will also be recorded in the field logbook. Entries will be dated and initialed. Entries will be made in ink, and will be legible.

1.7 Calibration Procedures and Frequency - The contracted laboratory will follow the NYSDEC Category-B requirements for equipment calibration procedures and frequency.

1.8 Analytical Procedures - Soil vapor samples will be chemically analyzed utilizing the procedures and protocols described in Sampling, Sample Preparation, & Analysis Requirements of EPA Compendium Method T0-15. Each stainless-steel SUMMA air sampling canister required for analysis utilizing EPA Method T0-15 will be specially pre-calibrated and prepared for the requisite six liter sampling volumes.

1.9 Data Reduction, Validation and Reporting

- **Field Data** - All field data recorded in logbooks or on log sheets will be evaluated in the Office and transferred to word processor text by field personnel or clerical staff. The QAO and/or PM will review this data for accuracy and completeness.

- **Laboratory Data** - The laboratory will transfer the instrument readings to laboratory report forms.

1.10 Internal Quality Control Checks

Both field and laboratory quality control checks are proposed for this project. In the event that there are any deviations from these checks, the Project Manager and Quality Assurance Officer will be notified. The proposed field and laboratory control checks are discussed below.

Field Quality Control Checks

- **Field Measurements -** To verify the quality of data collected using field instrumentation, at least one duplicate measurement will be obtained per day and reported for all field analytical measurements.

- **Sample Containers -** Certified-clean sample containers will be supplied by the contracted laboratory.

It is important to note, that field duplicates, rinse blanks, or trip blanks are not required for the raw and effluent SVE system sampling. However, if any shutdown or modification to the SVE system is proposed to occur, additional requirements (field duplicates) will be warranted at that time to support the decision process. This will be further discussed in a proposed plan at that time, which presents the details regarding the change to the system and how sampling will be performed to identify that the change is appropriate.

1.11 Performance and Systems Audits

Performance and systems audits will be completed in the field and the laboratory during the investigation phase of this project as described below.

- **Field Audits –** CA RICH's Project Manager and Quality Assurance Officer will monitor field performance and field meter calibrations to verify that measurements are taken according to established protocols. The Project Manager will review all field logs.

- **Laboratory Audits** – The contracted laboratory will perform internal audits consistent with NYSDEC ASP (2005).

1.12 Preventive Maintenance

Preventive maintenance schedules have been developed for both field and laboratory instruments. A summary of the maintenance activities to be performed is presented below.

- **Field Instruments and Equipment -** Prior to any field sampling, each piece of field equipment will be inspected to assure it is operational. If the equipment is not operational, it must be serviced prior to use. All meters which require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, it is the responsibility of the field personnel to follow the maintenance schedule and arrange for prompt service.

- **Laboratory Instruments and Equipment -** The laboratory will document Laboratory instrument and equipment procedures. Documentation includes details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (which will include information regarding the repair and the individual who performed the repair).

  Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

1.13 Data Assessment Procedures

The analytical data generated during implementation of the SMP will be evaluated with respect to precision, accuracy, and completeness. The procedures utilized when assessing data precision, accuracy, and completeness are presented below.

- **Data Precision Assessment Procedures -** Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements.

It is important to note, that field duplicates, matrix spike (MS) and matrix spike duplicate (MSD) samples are not required for the raw and effluent SVE system sampling. However, if any shutdown or modification to the SVE system is proposed to occur, additional requirements (field duplicates, MS and MSD samples) will be warranted at that time to support the decision process.

How this will be performed is detailed below:

Laboratory data precision for organic analyses will be monitored through the use of matrix spike duplicate sample analyses. For other parameters, laboratory data precision will be monitored through the use of field duplicates and/or laboratory duplicates.

The precision of data will be measured by calculation of the standard deviation (SD) and the coefficient of variation (CV) of duplicate sample sets. The SD and CV are calculated for duplicate sample sets by:

$$SD = (A-B)/1.414$$
$$CV = ((A-B)/1.414/((A+B)/2))$$

Where:

A = Analytical result from one of two duplicate measurements
B = Analytical result from the second measurement.

Where appropriate, A and B may be either the raw measurement or an appropriate mathematical transformation of the raw measurement (e.g., the logarithm of the concentration of a substance).

Alternately, the relative percent difference (RPD) can be calculated by the following equation:

$$RPD = \frac{(A-B)}{(A+B)/2} \times 100$$

$$RPD = 1.414\ (CV)(100)$$

- **Data Accuracy Assessment Procedures -** The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters, and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

  Laboratory accuracy will be assessed via the use of matrix spikes, surrogate spikes, and internal standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated as a percent recovery as follows:

$$Accuracy = \frac{A-X}{B} \times 100$$

  Where:

  A = Value measured in spiked sample or standard
  X = Value measured in original sample
  B = True value of amount added to sample or true value of standard

  This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for matrix spike recoveries and surrogate recovery objectives are identified in the NYSDEC, ASP (2005).

- **Data Completeness Assessment Procedures -** Completeness of a field or laboratory data set will be calculated by comparing the number of samples collected or analyzed to the proposed number.

$$\text{Completeness} = \frac{\text{No. Valid Samples Collected or Analyzed}}{\text{No. Proposed Samples Collected or Analyzed}} \times 100$$

As general guidelines, overall project completeness is expected to be at least 90 percent. The assessment of completeness will require professional judgment to determine data usability for intended purposes.

1.14 Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP, or the SMP. Corrective actions include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for this project are described below.

- **Field Procedures** - When conducting the investigative fieldwork, if a condition is noted that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action implemented will be documented as a memo to the project file and reported to the Project Manager.

  Examples of situations, which would require corrective actions, are provided below:

  - Protocols as defined by the QAPP and the SMP have not been followed;
  - Equipment is not in proper working order or properly calibrated;
  - QC requirements have not been met; and
  - Issues resulting from performance or systems audits.

  Project field personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

- **Laboratory Procedures -** In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action to be taken will be documented, and reported to the Quality Assurance Officer.

  Corrective action may be initiated, at a minimum, under the following conditions:

  - Specific laboratory analytical protocols have not been followed;
  - Predetermined data acceptance standards are not obtained;
  - Equipment is not in proper working order or calibrated;
  - Sample and test results are not completely traceable;
  - QC requirements have not been met; and
  - Issues resulting from performance or systems audits.

  Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

1.15 Quality Assurance Reports and Management

- **Reporting** – The Quarterly Monitoring Reports and Periodic Review Reports will be submitted to the NYSDEC. It is important to note, that data validation and the preparation of a DUSR is not required for the quarterly raw and effluent SVE system sampling.

  However, if any shutdown or modification to the SVE system is proposed to occur, additional requirements will be warranted at that time to support the decision process. This will be further discussed in a proposed plan at that time, which presents the details regarding the change to the system and how sampling will be performed to identify that the change is appropriate.

APPENDIX G

Site Management Forms

Periodic Review Report Site-Wide Inspection Check List
Former Zoe Chemical Site
1801 Falmouth Avenue
New Hyde Park, New York
NYSDEC Site #130211

Compliances to be Addressed	Comments
Provide an evaluation of the condition and continued effectiveness of engineering controls (foundation slabs, asphalt parking lot, SVE system).	
Are all institutional controls, including Site usage for commercial use in compliance?	
Are vegetable gardens and farming being prohibited?	
Is the use of groundwater being prohibited?	
What are the general Site conditions?	
What condition is the SVE system blower in? What is the flow rate at the influent? Effluent? What is the vacuum at the influent? Effluent?	
What condition is the SVE system piping in? What is the flow rate at each of the six SVE vents/wells? What is the vacuum at each of the six SVE vents/wells?	
Does Site access remain available to maintain engineering controls?	
Are all permits and schedules included in the Operation and Maintenance Plan in Compliance?	
Are any air supply, HVAC intakes, or adjoining/adjacent buildings constructed within 10 feet of any of the SVE vents?	
Has any intrusive work been done on the site within the reporting period; if so was the composite cover system breached? If so was the SMP adhered to?	

Inspector-
Date/Time-

Quarterly Monitoring Field Form

Former Zoe Chemical

1801 Falmouth Avenue

New Hyde Park, NY

Site No. 1-30-211

SVE System Data Log Field Form

Date		
System Status on Arrival		
System Status on Departure		
Control Panel Hours		
Control Panel Hours - Time Recorded		
Operating Hours Since Last Visit		
Hours Available Since Last Visit		
Percent Operation (quarterly)		
Moisture Separator Liquid Level (inches)		
Vacuum		
	SVE-1 ("WC) at Wellhead	
	SVE-2 ("WC) at Wellhead	
	SVE-3 ("WC) at Wellhead	
	SVE-4 ("WC) at Wellhead	
	SVE-5 ("WC) at Wellhead	
	SVE-6 ("WC) at Wellhead	
	System Influent ("WC)	
Temperature		
	Influent Temp (°F)	
	Effluent Temp (°F)	
Airflow		
	SVE-1 (CFM) at Wellhead	
	SVE-2 (CFM) at Wellhead	
	SVE-3 (CFM) at Wellhead	
	SVE-4 (CFM) at Wellhead	
	SVE-5 (CFM) at Wellhead	
	SVE-6 (CFM) at Wellhead	
	System Influent (SCFM)	
Volatile Organic Compounds		
	Pre-Carbon (ppm)	
	Mid-Carbon (ppm)	
	Post-Carbon (ppm)	

Notes:

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 and lab-supplied bottles, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service (bottle and sample delivery)		
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 (not including treated water)		
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:
Recommendations/Other:

CONTRACTOR CERTIFICATION
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of _____ (**Contractor Name**), which is responsible for the work documented on this form. According to my knowledge and belief, all of the information provided in this form is accurate and the site management program complies with the DER-10, DER-31, and CP-49 policies. _____ **Date** **Contractor**

APPENDIX H

O&M Manual

OPERATIONS AND MAINTENANCE MANUAL (O & M Manual)

For

SITE MANAGEMENT PLAN

1801 Falmouth Avenue
New Hyde Park, NY

NYSDEC SITE #130211

Prepared for:

Seaboard Estates, Inc.
c/o Beveridge & Diamond, LLC
477 Madison Avenue, 15th Floor
New York, NY 10022-5802

and

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12207

Prepared by:

CA RICH Geology Services, D.P.C.
17 Dupont Street
Plainview, NY 11803-1614

1.0 OPERATION AND MAINTENANCE MANUAL

1.1 General

This Operation and Maintenance (O&M) Manual provides a brief description of the measures necessary to operate, monitor, and maintain the mechanical components of the remedy selected for the Site.

This O&M Manual:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the active Soil Vapor Extraction (SVE) system;
- Will be updated periodically to reflect changes in the Site conditions or the manner in which the SVE system is operated and maintained.

A copy of this O & M Manual, along with the complete SMP, is kept at the Site. This O&M Manual is not to be used as a stand-alone document, but as a component document of the SMP.

1.2 Remedial System Performance Criteria

During the quarterly monitoring events, CA RICH will submit Quarterly Monitoring Reports to NYSDEC to describe the status of the SVE system and to provide a summary of operating conditions at the site. Information in the reports include the hours of operation during the reporting period, the influent and effluent concentrations of VOCs in the extracted vapors, date of sampling, mass removal rates and total mass removed, summary of the laboratory results from the influent and effluent samples, summary of non-routine repairs or modifications (if any), and the summary of activities conducted during the performance period (carbon change outs, major/minor equipment repair/maintenance).

In order to evaluate the performance criteria vapor readings are collected from the vapor sampling ports (influent, midpoint, and effluent) with a PID. Additionally, the samples of extracted vapors will be collected from the influent and effluent port of the SVE system for laboratory analysis by EPA Method TO-15. These samples will be used in assessing the amount of contaminant mass removed in the vapor. In addition, the airflow rates, vacuum, and temperature are obtained from the six wellheads as well as the influent and effluent ports to ensure the system is working adequately. These measurements have been obtained since the system start up in 2016, and therefore a general baseline of how the system is performing has been established.

1.3 Operation and Maintenance of the Soil Vapor Extraction (SVE) System

Drawings of the SVE system from the previous IRMs (that include certification pages signed and sealed by a PE who is licensed and registered in New York State) are provided. The blower shall not be serviced or repaired at the Site. If the blower fails, the unit will need to be removed and shipped out for repairs, or most likely replaced with another 4.62 HP regenerative blower, or equivalent.

1.3.1 System Start-up and Testing

Installation of the remediation system began in August 2016 and was completed in September 2016. A start-up test was conducted on September 21, 2016. The system was activated, and baseline vacuum, flow, and air samples were collected. A detailed description of the system is included in the Construction Completion Report – Part B. The SVE blower has remained in continuous operation since September 27, 2016.

In the event the SVE system turns off the system is equipped with a telemetry system that will notify the QEP. There can be several reasons why the SVE system may have turned off. Many pertain to the electric service within the building or overheating during summer months. The telemetry unit can advise you to a specific problem as well as the two alarm lights within the control panel (that are identified as “Auxiliary Alarm” or “Moisture Separator High Pump”). In order to turn the SVE system back on you must identify and open the control panel that is attached to the SVE system and labeled “Control Panel”. Once the control panel is opened there are two dials labeled “Control Power” and “SVE System Vac Extraction”. The control power should be turned to “on”, and the SVE System VAC Extraction should be turned to “auto”. There is a button labeled “Ready”. This should be pushed and will turn the SVE System back on.

1.3.2 Routine System Operation and Maintenance

The SVE system is designed to be maintenance free. Carbon change outs for the two carbon drums will occur periodically based on the monitoring results.

If any components fail (blower, filter, meters, telemetry etc.) they will be repaired or replaced. Please see the manufacturer’s instructions, provided.

1.3.3 Non-Routine System Operation and Maintenance

The SVE system as designed and operated has no non-routine operation and maintenance requirements. If any components fail (telemetry system, gauges, piping, filters, blower, moisture knockout drum, etc.) they will be replaced/repaired.

1.3.4 System Monitoring Devices and Alarms

The SVE system has a warning devise (a telemetry system) to indicate that the system is not operating properly. Additionally, the consultant will also be notified when there is blower failure, as well as when there is a high water level in the moisture knock out drum. In the event that warning device is activated, applicable maintenance and repairs will be conducted, and the SVE system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

1.4 Site Cover Control

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a minimum of asphalt pavement and concrete building slabs (the sidewalks are not part of the Site as per the survey detailing Site boundaries provided).

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Record of Decision. The existing cover system is comprised of a minimum of asphalt pavement, and concrete building slab. The demarcation layer,

consisting of orange snow fencing material, 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 the 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. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

Additionally, any disturbance of the site's cover system must be overseen by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

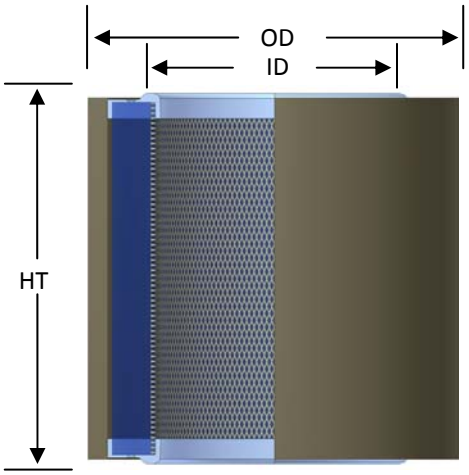
Replacement Elements
35 - 6600 SCFM Flow Range

Small Elements
with Molded Endcaps

Compact & Large Elements
with Metal Endcaps

Features

- Pleated media for high dirt holding capacity
- Polyester: Reinforced with epoxy coated steel wire on both sides of cloth
- Paper: Heavy duty industrial strength paper surrounded by heavy gauge galvanized expanded metal
- 40 - 50% increased dust loading capacity with prefilter (part number suffix P)
- Optimal surface area per given size



Technical Specifications

- Polyester: 99%+ removal efficiency to 5 micron
- Paper: 99%+ removal efficiency to 2 micron
- Temp (continuous): min -26°F (-15°C), max 220°F (104°C)
- Filter change out differential: 15-20" H2O over initial Δ P

Polyester Media Benefits

- Washable with lukewarm water & mild detergent
- Less maintenance due to longer durability
- Moisture resistant
- Handles hot air and oil mist from unload cycle of reciprocating/ piston compressor

Paper Media Benefits

- Optimal surface area per given size
- Higher efficiency than many alternative media
- Cost effective

www.solbergmfg.com • sales@solbergmfg.com • Sales: 630.773.1363 • Fax: 630.773.0727

AIRTECH® VACUUM

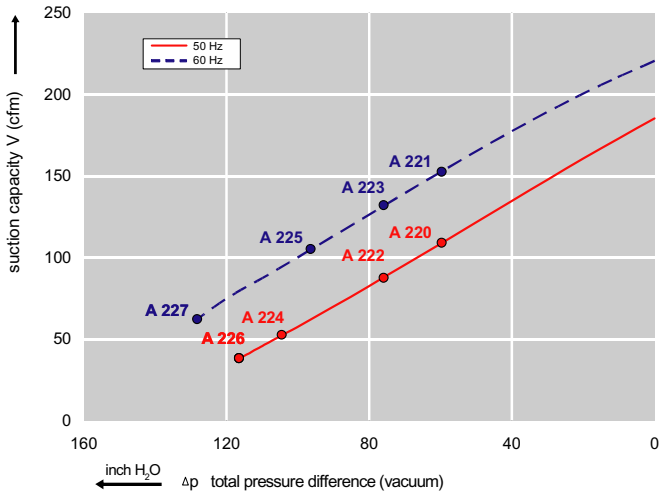
3BA1600

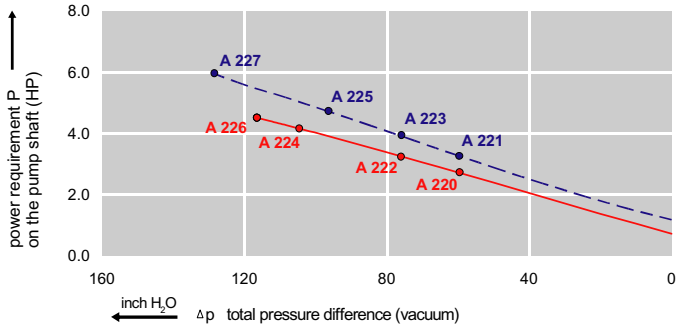
Vacuum/Pressure Regenerative Blower

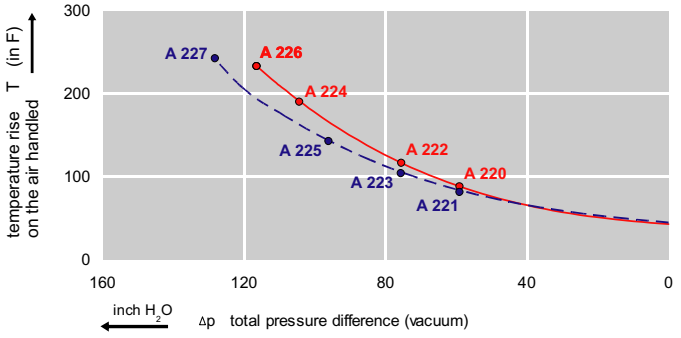
Features:

- Cooler running, outboard bearing provides maintenance-free operation
- Environmentally friendly oil-free technology
- Extremely quiet operation
- All motors are standard TEFC with Class F insulation, UL recognized, CE Compliant
  Explosion-Proof motors available
- Custom construction blowers are available
- Rugged die cast aluminum construction

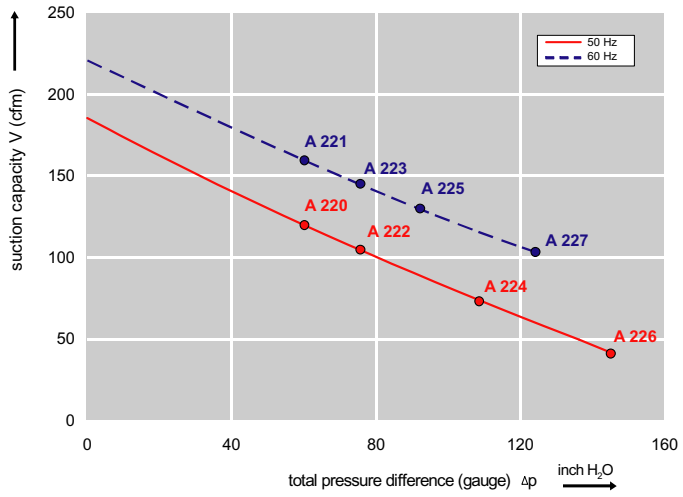
Performance curve for Vacuum pump

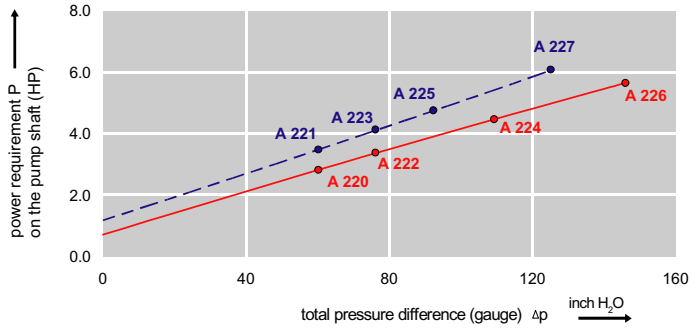


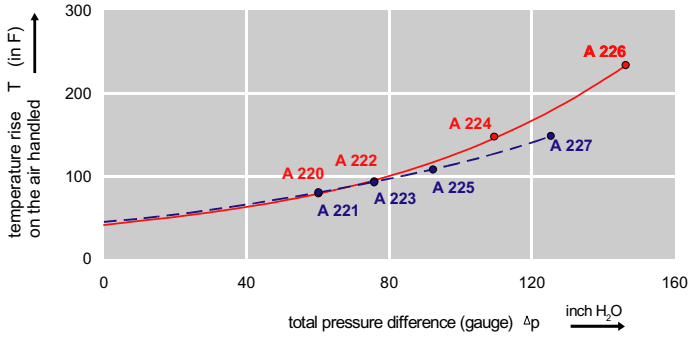




Performance curve for Compressor





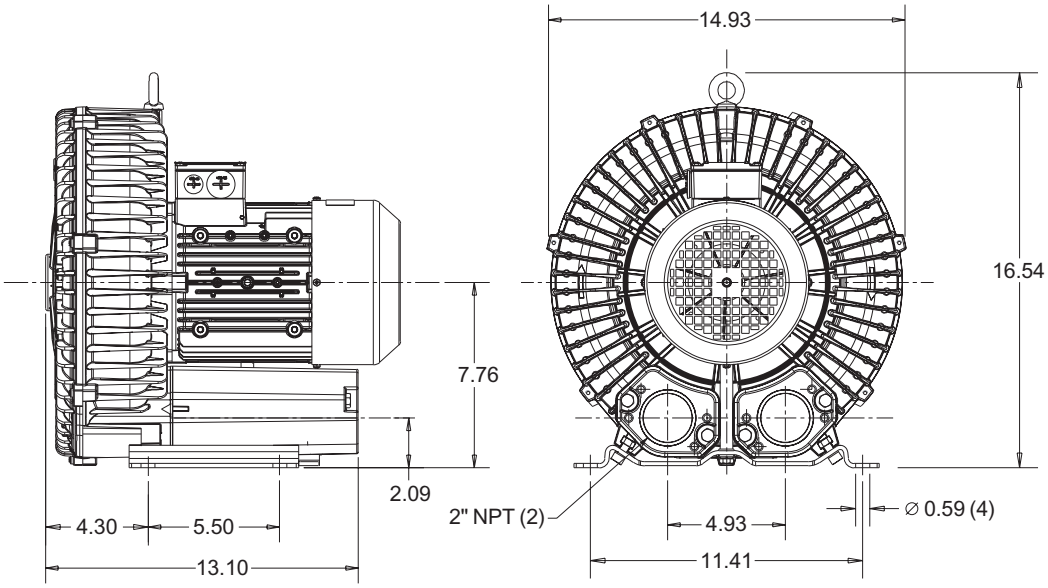


AIRTECH VACUUM

3BA1600

Vacuum/Pressure Regenerative Blower

Dimensions: (inches)



Recommended Accessories:

Relief valve:

VC61Z (Vacuum)

PC61Z (Pressure)

Filter:

ATF-200-15124/1 (Vacuum)

AF-S30-200-10 (Pressure)

Specifications subject to change without notice. Please contact factory for specification updates.

Selection & Ordering Data - Type 3BA1600

Curve No.	Order No.	Frequency Hz	Rated power HP	Input voltage V		Input current A		Permissible total differential pressure Vacuum inch H2O	Permissible total differential pressure Compressor inch H2O	Sound pressure level dB(A)	Weight lbs
3~ 50/60 Hz IP55 insulation material class F											
A 220	3BA1600-7AT06	50	2.15	200D ... 240D	345Y ... 415Y	8.5D	4.9Y	-64	60	69	57
A 221	3BA1600-7AT06	60	2.7	220D ... 250D	415Y ... 460Y	7.5D	4.4Y	-64	60	72	57
A 222	3BA1600-7AT16	50	2.95	200D ... 240D	345Y ... 415Y	9.7D	5.6Y	-76	76	70	64
A 223	3BA1600-7AT16	60	3.42	220D ... 250D	415Y ... 460Y	9.0D	5.3Y	-76	76	73	64
A 224	3BA1600-7AT26	50	4.02	200D ... 240D	345Y ... 415Y	12.5D	7.2Y	-104	108	70	75
A 225	3BA1600-7AT26	60	4.62	220D ... 250D	415Y ... 460Y	12.0D	6.5Y	-96	92	73	75
A 226	3BA1600-7AT36	50	5.36	200D ... 240D	345Y ... 415Y	13.0D	7.5Y	-116	145	70	93
A 227	3BA1600-7AT36	60	6.16	220D ... 250D	415Y ... 460Y	15.2D	8.5Y	-128	124	73	93

Suitable for 208 Volt Operation

Replacement Elements—up to 300 SCFM flow

Element Part Number		Element SCFM	Surface Area ft²		Dimensions - inches			STD Endcap
Polyester	Paper	Rating	Polyester	Paper	ID	OD	HT	Features
15P	14P	35	0.50	1.12	3	4 3/8	2 5/16	M
19P	18P	100	1.50	3.00	3	4 3/8	4 3/4	M
31P	30P	195	2.30	6.20	3 5/8	5 3/4	4 3/4	M
35P	34P	275	4.00	11.00	4 3/4	7 7/8	4 13/16	M
231P	230P	300	4.50	11.8	3 5/8	5 3/4	9 1/2	M

Note: Also available in wire mesh. Example part number for wire mesh: 230S

Dimension tolerance ± 1/4”

See Element Technical Data section for maintenance guidelines

Replacement Elements—up to 6600 SCFM flow

Element Part Number		Element SCFM	Surface Area ft²		Dimensions - inches			STD Endcap
Polyester	Paper	Rating	Polyester	Paper	ID	OD	HT	Features
235P	234P	570	8.3	22.8	4 3/4	7 7/8	9 5/8	M
335P	334P	800	12	34	4 3/4	7 7/8	14 1/2	M
237	236	550	8.6	22.6	4 2/3	7 3/4	8 1/2	GBN
239P	238P	570	11.5	52	4 7/8	9 1/4	10	GBN
245P	244P	880	14	35.5	6	9 3/4	9 5/8	GN | M
345P	344P	1100	22.1	57	6	9 3/4	14 1/2	GN
275P	274P	1100	19	45.4	8	11 3/4	9 5/8	GN
375P	374P	1500	28	68.1	8	11 3/4	14 1/2	GN
377P	376P	1825	50	125	9	14 5/8	14 1/2	GN
385P	384P	3300	50	140	14	19 5/8	14 1/2	GN
485P	484P	4705	75	200	14	19 5/8	21 1/2	GN
685P	--	6600	100	--	14	19 5/8	28 1/2	GN

Note: Most are available in wire mesh. Example part number for wire mesh: 244S

Dimension tolerance ± 1/4

See Element Technical Data section for maintenance guidelines

Endcap Information

M = Molded plastisol

B = Closed one end with **b**olt hole, open on other end

G = **G**alvanized metal endcaps

N = Neoprene gaskets on open end(s)

Additional Media Options

- 1, 4, 25, and 100 micron Polyester
- HEPA
- Stainless steel wire mesh
- High temperature Nomex
- Stainless steel Nomex reinforced by stainless steel wire mesh & expanded metal
- Polypropylene
- Activated carbon

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

Moisture Separator #AWS80-3

ESD Waste2Water, Inc.
Partnership for a Cleaner Tomorrow

Air / Water Separators

ESD Waste2Water, Inc. ESD custom fabricates Air / Water Separators for Soil Vapor Extraction and Dual Phase Extraction applications. Made of structurally sound, light-weight marine grade 5052 aluminum, our separators can withstand full vacuum applications and are completely corrosion resistant. Unlike carbon steel based separators, ESD Separators resist both internal chemical corrosion and the harshest external environmental conditions. The aesthetic qualities of ESD Separators are never compromised by oxidation. ESD Separators never experience corrosive pitting leaks, because our designs render expensive internal/external epoxy mastic coatings entirely unnecessary.

ESD Separators are available in many standard sizes and can be custom designed with a wide variety of options, including pump out systems, level gauging, additional particulate filtration, and baffling for high entrained

UL® Certified to UL-508A Standards

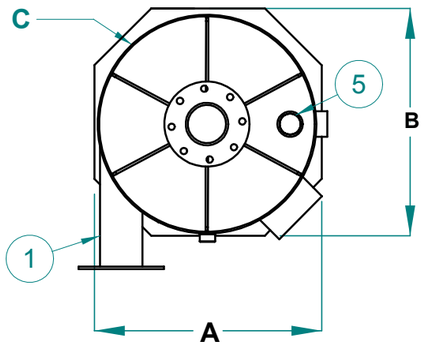
Thank you for allowing ESD to provide a solution to your equipment needs.

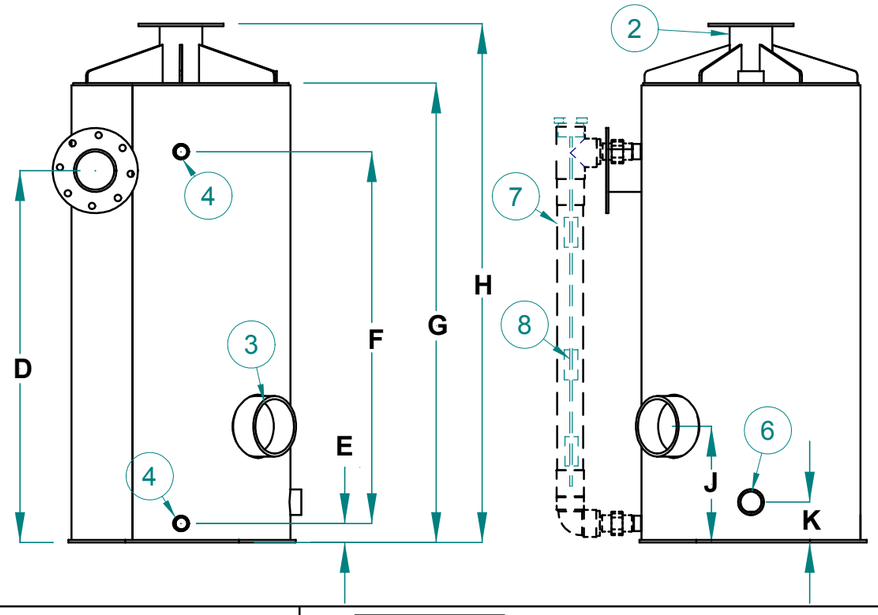
ESD Waste2Water, Inc.
495 Oak Road
Ocala, FL 34472
Tel: 800.277.3279 Fax: 352.680.9278
www.waste2water.com

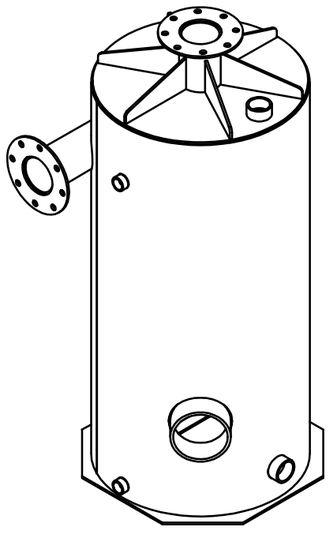
STANDARD AWS SPECIFCATION

TYPE	WORKING VOLUME @(LSH)	AVAILABLE CONNECTION TYPE																CLEAN OUT PIPE	A	B	C (DIA.)	D	E	F	G	H	J
		FLANGE						MNPT					FNPT														
		2"	3"	4"	6"	8"	10"	2"	3"	4"	6"	8"	2"	3"	4"	6"	8"										
AWS30	12 GAL	X	X	X	-	-	-	X	X	X	-	-	X	X	X	-	-	6"	-	-	16 1/4"	25"	2"	19"	30"	33 1/2"	6"
AWS60	24 GAL	X	X	X	X	-	-	X	X	X	X	-	X	X	X	-	-	6"	24"	24"	23"	25"	2"	23"	30"	36 1/2"	6"
AWS80	47 GAL	X	X	X	X	-	-	X	X	X	X	-	X	X	X	-	-	8"	24"	24"	23"	39"	2"	39"	48"	54 3/4"	12"
AWS120	50 GAL	X	X	X	X	X	-	X	X	X	X	-	X	X	X	-	-	8"	24"	24"	23"	49"	2"	49"	60"	66 3/4"	12"
AWS220	107 GAL	-	X	X	X	X	X	X	X	X	X	-	X	X	X	-	-	8"	34"	34"	33 1/2"	49"	2"	49"	60"	66 3/4"	12"

RECOMMENED AIR FLOW (ACFM)						
	2"	3"	4"	6"	8"	10" *
ACFM	120	280	320	500	750	1000







ITEM #	DESCRIPTION
1	INLET PIPE (SEE TABLE FOR AVAILABLE SIZE AND CONNECTION TYPE)
2	OUTLET PIPE (SEE TABLE FOR AVAILABLE SIZE AND CONNECTION TYPE)
3	CLEAN OUT
4	1" FNPT (MULTI LEVEL PROBE)
5	2" FNPT
6	2" FNPT
7	SIGHT TUBE 2" CLEAR PVC
8	MULTI LEVEL PROBE

NOTES:
1.MATERIAL : 1/8" & 3/16" ALUMINUM SHT 5052
2. PROBE (SIGHT TUBE) : 2" CLEAR PVC
3. CUSTOM SIZES AVAILABLE

ESD Waste2Water, Inc.

495 Oak Road
Ocala, FL 34472
Phone (800) 277-3279
Fax (352) 680-0059

SCALE VERIFCATION

THIS BAR REPRESENTS ONE INCH ON ORIGNAL DRAWING

1"

USE TO VERIFY DRAWING

SIZE: B **SHEET #:** 1 OF 1

SCALE: NTS

UPDATED BY:

DRAWN BY: J.ANDREWS

APPROVED BY: N/A

COMPLETED: 06/15/10

UPDATED:

AWS SPECIFICATIONS
GENERAL LAYOUT

JOB NUMBER:

PRODUCT NUMBER: **AWS**

FILE NAME: "AWS SPEC.dft"