MOVE YOUR ENVIRONMENT FORWARD

SITE CHARACTERIZATION WORK PLAN

Former New York Cleaning and Dyeing Off-Site
Site # C224264A
376-378 Flushing Avenue
Brooklyn, New York 11234

Prepared For:

Contract# D009808, Work Assignment No. 38
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7012

Prepared By:

HRP Associates, Inc.
1 Fairchild Square, Suite 110
Clifton Park, NY 12065

HRP #: DEC1038.P2

Issued On: March 28, 2024

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Purpose and Objectives 1
1.2 Site Description and Background Information 2
1.3 Site Geology and Hydrogeology 2
1.4 Previous Investigations and Remedial Actions 3
1.5 Areas of Concern 8

2.0 SITE CHARACTERIZATION SCOPE OF WORK 9

2.1 Preliminary Activities 9
2.1.1 Work Plan 9
2.1.2 Health and Safety Plan 9
2.1.3 Quality Assurance Project Plan 9
2.2 Investigation, Environmental Sampling, and Implementation 10
2.2.1 Property Access and Permit Acquisition 10
2.2.2 Underground Utility Clearance and Ground Penetrating Radar 11
2.2.3 Site Walkthrough, Assessment of Existing Monitoring Wells in ROW, Soil Boring Installation and Waste Characterization Sampling 11
2.2.4 Groundwater Characterization 14
2.2.4.1. Recovery and Monitoring Well Installation 14
2.2.4.2. Well Development 14
2.2.4.3. Monitoring Well Sampling and Gauging 15
2.2.5 Soil Vapor Intrusion Investigations 16
2.2.5.1. Sub-Slab SVI Investigations 16
2.2.6 Sample Handling Procedures 17
2.2.7 Decontamination Procedures 17
2.2.8 Disposal of Investigation Derived Waste 17
2.2.9 Analytical Data Quality Evaluation 18
2.2.10 Survey of Investigation Locations 18
2.3 Site Characterization Report 19
2.3.1 Electronic Data Delivery 19
2.3.2 Site Characterization Report 19

3.0 GREEN AND SUSTAINABLE REMEDIATION BEST MANAGEMENT PRACTICES 20

4.0 SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN 21

4.1 Site-Specific Sampling 21
4.2 Data Quality Assessment and Usability 21

5.0 PROJECT MANAGEMENT 22

5.1 Project Schedule and Key Milestones 22
5.2 Key Project Personnel 23

6.0 REFERENCES 24

Figures

Figure 1 Site Location
Figure 2 Proposed Sample Locations
Figure 3 Surrounding Property Use

Tables

Table 1 Historic Property Use and Relevant Regulatory Findings
Table 2 Sampling Summary
Table 3 Analytical Methods/Quality Assurance Summary

Appendices

Appendix A Site-Specific Health and Safety Plan
Appendix B Community Air Monitoring Plan

General Information

Project/Site Information:

Former New York Cleaning and Dyeing Off-Site
376-378 Flushing Avenue
Brooklyn, New York
DEC Site ID #C224264A

Consultant Information:

HRP Associates, Inc.
1 Fairchild Square, Suite 110
Clifton Park, NY 12065
Phone: 518-877-7101
Fax: 518-877-8561
E-mail: Patrick.Montuori@hrpassociates.com
Project Number: DEC1038.P2

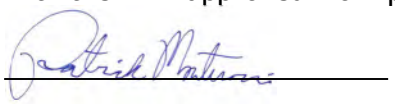
Client Information:

Contract# D009808-38
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7017

Work Plan Date: March 28, 2024

QEP Certification:

I, Patrick Montuori, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Work 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.



Patrick Montuori, P.G. - Project Manager

1.0 INTRODUCTION

On November 23, 2022, HRP Associates, Inc. (HRP) was authorized to complete this New York State Department of Environmental Conservation (NYSDEC) Work Assignment (WA) No. 38 (D009808-38) for Site Characterization (SC) for the Former New York Cleaning and Dyeing Off-Site (Site No. C224264A), which centers around the 376-378 Flushing Avenue Site (Site No. C224264) located at 376-378 Flushing Avenue, Brooklyn, NY (the Site). The focus of this SC is to characterize potential impacts to off-site receptors related to volatile organic compound (VOC) contamination which has been identified in on-site soil, soil vapor, and groundwater and light non-aqueous phase liquids (LNAPL) detected in wells in the vicinity of the Site. The scope of work for the SC, discussed herein, was developed based on HRP's review of previous investigations conducted between 2017 and 2022 as well as discussions and planning with NYSDEC staff.

1.1 Purpose and Objectives

This SC Work Plan (Work Plan) describes the details of the scope of work, including all proposed field activities, laboratory analyses, and data QA/QC evaluation that will be associated with the SC at the Site. This document is intended to supplement information provided in the NYSDEC-approved *Generic Field Activities Plan for Work Assignments*, completed by HRP on August 8, 2019.

The purpose of the SC is to determine whether a Site poses little or no threat to public health and the environment or if it poses a threat and whether the threat requires further investigation. In accordance with DER-10 *Technical Guidance for Site Investigation and Remediation (May 2010),* the primary objectives of the SC scope of work are to:

- Investigate the identified areas of concern (AOCs) associated with the Site, determine if they have resulted in surface or subsurface contamination, and evaluate the extent of the contamination.
- Obtain geologic and hydrogeologic data from the Site. The specific information that should be collected and/or verified includes soil types (or fill), depth to groundwater, groundwater flow direction, subsurface geology, bedrock characteristics, etc.
- Determine if applicable standards, criteria, and guidance contained in NYSDEC DER-10 and set forth for the Site are contravened.
- Preliminarily delineate the vertical and horizontal extent of contaminated groundwater, if any.
- Establish a baseline for any remedial work that will be necessary to address impacted media.
- Determine if the Site represents a threat to public health or the environment.

1.2 Site Description and Background Information

The off-site area surrounding the Former New York Cleaning and Dyeing Site (#C224299), located at 376-378 Flushing Avenue, Brooklyn, NY (**Figure 1**), is the focus of this investigation. The 0.882-acre Site currently consists of a recently redeveloped eight-story mixed-use commercial and residential building on Block 1884, Lots 40 and 48. The Site is depicted on **Figure 2**.

The property is zoned R7A/C2-4 (mixed use residential/commercial) on the NYC Zoning Tax Lot Database. Properties surrounding the Site consist of residential apartments, commercial and retail businesses and school buildings. At present the areas surrounding the property (within 200 feet [ft]) include:

North: Residential Apartment Building across Flushing Avenue, Former Arkansas Chemical Co (Site No. C224172, 60 ft), Viznitz School for Girls (60 ft), Yeled VYalda Torah daycare (125 ft), Point Plaza Hotel (210 ft).
South: Aura Medical, Baron Medical supply, The Homery, and NYS Accounting (0 ft), W&T Seafood (115 ft), Residential Apartments, Linden Hardware Store, Flyinkolors, Allede Lighting, and Silver Office Supplies (50 ft), and multiple commercial business (150 ft)
East: Parts Authority Auto Parts, across Franklin Avenue (60 ft), Residential apartment buildings (60 ft), a pharmacy and other retail commercial businesses (200 ft).
West: Residential properties (0 ft), Former Kent Avenue Central Shop/ New York City Department of Environmental Protection (NYCDEP), across Kent Avenue (Spill 9601072, 105 ft), and Retail/commercial businesses, across Taaffe Place (200ft).

Surrounding properties of interest based on their historic uses are presented on **Table 1**. Current and historical property use is depicted on **Figure 3**.

Site history was detailed in the Equity Environmental Engineering (Equity) August 2015 Phase I Environmental Site Assessment (ESA) and the May 2017 Remedial Investigation (RI) report prepared by Environmental Business Consultants (EBC). Industrial operations likely first occurred at the Site by 1935 with a building on-site which reportedly operated as a parking garage and two buildings on the western portion of the Site utilized as an auto repair shop and a paper company. Two gasoline underground storage tanks (USTs) were identified associated with the former parking garage for the years 1935 through 2007. In the 1940s, the Site was redeveloped as a dry cleaner. Dry cleaning operations were purportedly in operation in 1947 through 2017. One gasoline UST was identified for the former shipping warehouse on the eastern portion of the Site for the years 1965-1989.The buildings on-site were razed for redevelopment in 2019. Following remediation in 2019, the Site was redeveloped into an eight-story mixed use building with retail spaces on the 1st floor, residential dwellings on floors 2 through 8, including a basement with ventilated parking, and mechanical rooms.

1.3 Site Geology and Hydrogeology

The Site lies at an elevation of approximately 16 ft above mean sea level (amsl). Topography of the Site and surrounding area is relatively flat, but gently slopes toward the East River north of the Site.

The United States Geological Survey (USGS) "Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York, and Parts of Bergen and Hudson Counties, New Jersey" indicate the bedrock underlying the Site is part of the Hartland Formation, a mica-schist and quartz feldspar granulite. According to the USGS "Bedrock-Surface Elevation and Overburden Thickness Maps of the Five Boroughs, New York City, New York" data report, the top of bedrock at the Site is expected to be between 150 and 200 feet below grade (fbg). In addition, bedrock is shown sloping to the southeast. Bedrock is overlain by the Upper Cretaceous Raritan Formation, the lower layer of coastal plain deposits, consisting of clay, silty clay, sand and gravel (Fisher et al.,1970). Site surficial geology is mapped as till, deposited by glacial ice with a variable texture consisting of poorly sorted mixtures of clay, sand, silt, and gravel (Caldwell et. al., 1986). According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the Site and surrounding area are mapped as Urban Land.

Soil borings installed during the previous RI indicate that the Site soils consist of historic fill material to 12-14 ft bg, underlain by native brown-gray sandy clay to approximately 25 ft bg (the maximum depth at which soil was screened by previous investigations). Bedrock was not encountered during previous investigations (EBC, 2017).

Regional groundwater is expected to flow towards the East River, located north and northwest of the Site. Depth to groundwater ranges from 9 to 13 ft bg. Localized groundwater at the Site may be controlled by preferential pathways, such as underground utilities. Groundwater flow at and around the Site has varied over the years and may have been influenced in the past by pump and treat operations (2003-2018) at the adjacent off-site Kent Avenue Central Shop property located at 350 Flushing Avenue. A groundwater contour map prepared for the EBC RI indicates groundwater beneath the Site generally flows to the southwest (EBC, 2017). According to the 2019 Evaluation of Existing Conditions report completed by EBC, groundwater at the adjacent property north of the Site (74 Wallabout Street) in 2013 flowed to the northwest. The 2020 Final Engineering Report completed by AMC Engineering PLLC (AMC) states groundwater at the Site flows in a southeasterly direction. For the purposes of this Work Plan, HRP is considering the most recent on-site groundwater data collected from 2020 to be the presumed flow direction at the Site (southeast).

1.4 Previous Investigations and Remedial Actions

In preparation of this work plan HRP reviewed the following previous investigation reports and documents:

- Phase I ESA, prepared by Equity, dated August 2015.
- Remedial Investigation Report (RI) prepared by EBC, dated May 2017.
- Final Engineering Report (FER), prepared by AMC, dated December 2020.
- Periodic Review Report, prepared by AMC, dated May 2022.

August 2015 Phase I ESA

The following Recognized Environmental Conditions (RECs) were identified for the Site:

- Underground Storage Tanks (USTs) – Gasoline USTs were noted for the Site on historical Sanborn maps. The Site was identified with two gasoline USTs for the years 1935-2007. One gasoline UST was identified on the Site for the years 1965-1989. EBC could not determine whether these tanks have been removed. It is also unknown whether there were any releases to the Site from this tank and if the gasoline tanks were properly abandoned, removed, and/or disposed of.

- Former Dry-Cleaning Operations – Dry cleaning operations were noted for the western building on the Site on historical Sanborn maps for the years 1947-1993. EBC could not determine whether dry cleaning operations were performed on-site or whether it was a drop-off facility.

- Former Auto Repair Use – A portion of the western building on the Site was identified as an auto repair garage on historical Sanborn maps for the year 1935.

- Drum of Unknown Contents – A corroded drum was observed within the warehouse of the Site. The drum was located next to the grease trap and is likely associated with the grease from the adjacent restaurant; however, this could not be confirmed.

- Unidentified Pit - A pit was observed in the southwest corner of the Site. Although the Phase I report identifies an approximate 2x2x2 ft pit located in the southwestern portion of the Site as a REC, it appears that this was a former sump pit that may have been associated with the former washing machines identified for this portion of the property on the historical Sanborn maps.

- Interior Staining – An apparent grease stain was observed on the concrete floor of the warehouse on the Site during the time of inspection. The report identifies that the staining is in the vicinity of the grease trap used for the catering kitchen in the adjacent building.

AOCs identified for the Site include:

- The presence of historical fill material ranging in depths from approximately 5 to 12 ft bg.

- The Site was utilized by a dry cleaner on the western portion of the Site from 1947-1993; and as a former auto repair garage for the year 1935.

- The Site was identified with three underground storage tanks on historical Sanborn maps.

May 2017 Remedial Investigation Report

Prior to Site redevelopment, EBC conducted a RI at the Site under the New York City Voluntary Cleanup Program. A brief summary of the work performed, and the results of the investigations are below.

- EBC installed 10 soil borings (SB-1 through SB-10) across the Site and collected 23 soil samples for laboratory analysis. All samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and target analyte list (TAL) metals. Petroleum-related VOCs (benzene, toluene, ethylbenzene, xylenes [BTEX], trimethylbenzene), individual SVOCs, metals, and pesticides were detected at concentrations greater than the Unrestricted Use and Restricted Use Soil Cleanup Objectives (SCOs) from varying depths from just below the ground surface, extending to at least 22 ft bg, across the footprint of the Site.

- Four temporary 1-inch groundwater monitoring wells (GW-1, GW-3 through GW-5) were installed throughout the Site and four groundwater samples were submitted for laboratory analysis of VOCs, SVOCs, pesticides, PCBs, and total and dissolved TAL metals. Petroleum related VOCs and individual SVOCs were detected at concentrations greater than the NYSDEC Class GA criteria in the wells sampled. Additionally, monitoring well GW-5, located on the northeastern portion of the Site, contained 0.12 ft of free product. A sample was submitted for fingerprint analysis and the results deemed inconclusive but indicated a carbon range of C9 to C14.

- Ten soil vapor probes were installed to 8 ft bg at the Site. Each vapor point was installed and sampled in accordance with NY State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Petroleum related VOCs and chlorinated VOCs (CVOCs) were detected in the soil vapor samples at the Site. Tetrachloroethene (PCE) was detected in all ten samples, and trichloroethene (TCE) was detected in four of the ten samples; the PCE and TCE concentrations exceeded mitigate conditions for sub-slab vapor within the NYSDOH Final Guidance on Soil Vapor Intrusion.

December 2020 – Final Engineering Report

In 2018 AMC managed remediation of the Site to track Unrestricted Use SCOs. The remedial actions are summarized below.

- On February 2, 2018, Rose Castle Development II LLC entered into a Brownfield Cleanup Agreement (BCA) with the NYSDEC to further remediate the Site. The property was remediated to unrestricted use criteria and was redeveloped with the construction of a new 8-story mixed-use building.

- During Site excavation, a total of twenty-four USTs of varying sizes (275 to 10,000-gallon) were unearthed. Eastern Environmental was contracted to cut and clean the USTs and the removal of the USTs was completed by February 27, 2019. During the removal of

the USTs, approximately 23,496 gallons of non-hazardous, non-DOT, non-RCRA-regulated liquids were removed by Eastern Environmental Solutions, Inc. Tanks and all associated piping were removed and disposed of at a permitted scrap metal facility. The AMC report indicated that the contents of all twenty-four USTs were #2 fuel oil. The removed tanks were subsequently de-registered with the NYSDEC. Oily water was identified on the Site post tank removal and likely originated from the contents of the USTs that were unearthed from the Site mixing with perched water/stormwater. This water was removed from the excavation and disposed off-site. Shallow groundwater during excavation activities was also identified, dewatered, treated on-site, and discharged off-site.

- Monitoring wells MW-1 and MW-2 were installed on the sidewalk immediately east and downgradient from the Site for groundwater monitoring. MW-3 was reportedly installed across from the Site, on Flushing Avenue, however this well was not included on any FER figures and no groundwater sampling or gauging data was presented in subsequent reports.

- MW-1 was installed as a 2-inch well to a depth of 20 ft bg, with 15 ft of well screen. MW-2 is a 2-inch diameter PVC monitoring well installed to a depth of 28 ft with 18 ft of screen. The off-site monitoring well MW-3, is a 4-inch diameter PVC monitoring well installed to a depth of 24.80 ft with 20.8 ft of screen of an unspecified size.

<u>May 2022 Periodic Review Report</u>

The 2022 Periodic Review Report is a quarterly groundwater monitoring report completed by AMC for the Site.

- Quarterly sampling data is provided from January 2021 through March 2022. The purpose of the quarterly sampling was to evaluate if dissolved phase VOCs are migrating off-site. Recent sampling results showed that groundwater moving off-site to the west were not significantly impacted.

- Groundwater concentrations at off-site well MW-2 from December 30, 2021 showed that no VOCs were detected above NYSDEC Class GA criteria. A Groundwater Monitoring Response letter from the Department dated February 10, 2022 approved the request to discontinue groundwater monitoring from MW-2, therefore no groundwater sampling was completed from MW-2 after Q4 2021.

- Groundwater concentrations in MW-1 from March 2022 only slightly exceeded Class GA criteria for 2-isopropyltoluene, isopropylbenzene, n-propylbenzene, and sec-butylbenzene.

In addition, HRP reviewed available information from the following NYSDEC remediation and spills sites which are located in close proximity to the Site.

- NYCDEP/ Kent Avenue Central Shop, Spill No. 9601072, located approximately 110 ft west of the Site.

- Former Arkansas Chemical Co., Site No. C224172, located approximately 70 ft north of the Site.

Kent Avenue Central Shop (Spill 9601072)

Both dissolved phase VOCs and SVOCs and LNAPL have been identified in groundwater at the Kent Avenue Central Shop (Spill 9601072) at 350 Flushing Avenue, located west of the Site, directly across Kent Avenue. The spill was opened in 1996 following the removal of four underground storage tanks. Since 1996, investigation, remedial measures, and monitoring have been performed in relation to the LNAPL detected in monitoring wells within the property footprint and on the Kent Avenue sidewalk. LNAPL has been consistently observed in multiple wells associated with the investigation of this spill. Most recently, LNAPL has been limited to wells LMW-01, MW-09, DPE-08, and DPE-14, with the greatest thicknesses observed in LMW-01, located on the eastern/downgradient perimeter of the Kent Avenue Central Shop. Since 2019, LMW-01 has exhibited a range of thicknesses between 0.0 ft to 2.01 ft, and shows fluctuating, but generally declining thicknesses. LNAPL was not detected in any wells between September 2021 to January 2022, the most recent sampling event conducted.

Multiple groundwater gauging events indicate groundwater flow to the east, towards the 376-378 Flushing Avenue Site. Fingerprint analysis of the LNAPL in LMW-01 was determined to be of mineral spirits and having different physical and chemical characteristics of the LNAPL previously detected at the project site, suggesting that there may have been multiple releases of petroleum hydrocarbons at the Kent Avenue site and/or from an off-site source. Six wells (MW-02R, MW-03, MW-08, MW-09, MW-15, and DPE-13) exhibit VOC concentrations in groundwater above the NYSDEC Class GA criteria. Previous remedial activities at this project site include UST abandonment, a dual phase extraction (DPE) system (which was removed from the site in February 2019) and enhanced fluid recovery (EFR) events. Ongoing remedial activities include semi-annual groundwater monitoring, monthly monitoring well gauging, and EFR as required.

Former Arkansas Chemical Co. (C224172)

The former Arkansas Chemical Co. BCP site (BCP Number C224172) is located north of the Site, across Flushing Avenue. In January 2014, during remedial investigations and activities, nine USTs, containing diesel, gasoline, and fuel oil, ranging in size from 550 to 3,000-gallons, were discovered and removed. Several of the USTs were found to be in poor condition with corrosion holes, and LNAPL was observed on the water table beneath the USTs located on the western/northwestern portion of the property. In 2014, site excavation was completed, and soils were excavated to varying depths based upon soil impacts and attainment of SCOs and/or construction purposes; soils were generally excavated to between 8 and 15 ft bg. Dewatering and LNAPL removal occurred simultaneously. The dewatering system consisted of an oil-water separator to remove LNAPL captured during dewatering activities. Additionally, a vacuum extraction truck was utilized to remove LNAPL observed within the excavations, and when observed, the excavation was left open and LNAPL pumped out until no longer observed on the water table. A total of 18,900-gallons of LNAPL/water

were removed from the site. The results of groundwater monitoring following remedial activities were not discussed in the FER.

An Evaluation of Existing Conditions Report dated April 2019 for the Former Arkansas Chemical Site completed by EBC indicated that LNAPL was identified in off-site monitoring well MW005 located on Kent Avenue adjacent to the Former Arkansas Chemical Co. site. Weekly and quarterly LNAPL removal events were ongoing at MW005 but the removal frequency following November 2018 is unknown. Groundwater was reported to flow west-northwest in this report. Additionally, LNAPL was not observed in nearby wells south of MW005 (MW008, OB003, and OB004).

1.5 Areas of Concern

- LNAPL is present on the Kent Avenue Central Shop property. Sampling at the Kent Avenue Central Shop site suggests it may be from an off-site source. Although groundwater flow is documented to the east on both sites, preferential pathways could direct LNAPL from the Site to the Kent Avenue Central Shop. It is also possible that LNAPL on the adjacent Kent Avenue Central Shop property could be from the Former Arkansas Chemical site.

- VOC concentrations in on-site groundwater exceed NYSDEC Class GA criteria and may be migrating off-site and contributing to the contamination identified in the off-site Kent Avenue Central Shop sampling events. The off-site area is served by a public water supply therefore VOCs in groundwater are not likely to present a direct exposure pathway for off-site receptors.

- Prior to remediation of the Site property, PCE and TCE concentrations in soil vapor were detected above mitigate conditions. Potential off-site receptors, including retail businesses and residential apartment buildings, may be exposed to VOC/CVOC contamination through SVI into indoor air. These off-site properties may also have impacted soil or groundwater in the subsurface related to their own historical operations or the Site's historic operations. SVI has not been conducted at these properties to date.

Based on the findings of previous investigations and discussions with NYSDEC and NYSDOH, HRP has developed the following scope of work to investigate off-site exposure pathways through the installation and sampling of off-site groundwater monitoring wells and completion of off-site SVI investigations.

2.0 SITE CHARACTERIZATION SCOPE OF WORK

This scope of work has been designed to gather data to evaluate each project objective listed in **Section 1.1**. The following sections provide specifics regarding the scope of work developed under this NYSDEC-approved Work Assignment (D009808-38) in support of the 376-378 Flushing Avenue SC (#C224264A).

2.1 Preliminary Activities

As part of the scope of work, the following documents have been prepared under this Work Assignment:

- Site-Specific Work Plan (this document) to accompany the generic Field Activities Plan (FAP),
- Site-Specific Health and Safety Plan (HASP) (included as **Appendix A** of this Work Plan),
- Site-Specific Quality Assurance Project Plan (QAPP).

The NYSDEC-approved generic FAP, HASP, and QAPP are on file with the NYSDEC. The site-specific elements are described below.

2.1.1 Work Plan

This Work Plan has been prepared for use in performing the SC and will serve as the site-specific FAP. This Work Plan identifies the components of the SC and a description of the tasks to be performed including the specific methods or procedures that will be used to conduct the field sampling. A proposed project schedule is included in **Section 5.1** of this Work Plan.

2.1.2 Health and Safety Plan

A site-specific HASP is provided in **Appendix A**. The site-specific HASP provides guidance to maximize health and safety of on-site workers during SC-specific tasks including media sampling, installation of wells, surveying and other field related activities. Included as **Appendix B** is a Community Air Monitoring Plan (CAMP) that details procedures for air monitoring during intrusive activities. The generic HASP has guidelines for health and safety supervision, air monitoring, medical monitoring, personal protective equipment, site controls, safe work practices and decontamination, etc.

2.1.3 Quality Assurance Project Plan

A site-specific QAPP has been prepared and is included in **Section 4** of this Work Plan. The site-specific QAPP was prepared as a supplement to the Generic QAPP with necessary site-specific information. Deviations from the protocols specified in the QAPP will be subject to the NYSDEC approval.

The Generic QAPP provides general information related to QA/QC procedures associated with the collection and analysis of samples of environmental media and includes specific representative

standard operating procedures (SOPs) applicable to sample handling and field instrumentation use. Information provided in the Generic QAPP includes definitions and generic goals for data quality and required types and quantities of QA/QC samples. The procedures address field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA/QC reporting specific to the analyses performed by the laboratories that are used for analysis of environmental media collected under Standby Contract No. D009808.

All laboratory analytical work will be performed by a NYSDOH Environmental Laboratory Approval Program (ELAP) approved laboratory certified in all categories of Contract Laboratory Protocol (CLP) and Solid and Hazardous Waste analytical testing. A Data Usability Summary Report (DUSR) will be included in a Letter Report (described in **Section 2.3** of this Work Plan) for each round of analytical work. Category B deliverables will be retained in the project files and available for full data validation by a qualified, independent third party.

2.2 Investigation, Environmental Sampling, and Implementation

The SC will consist of the installation and sampling of three off-site groundwater monitoring wells, and the completion of SVI investigations at two off-site structures. The number and types of samples to be collected are discussed below and summarized on **Table 2**. The field investigation tasks for the Site are listed below in the order that they are expected to be completed:

1. Obtain Access Agreements with Off-Site Property Owners and Acquire Permits
2. Underground Utility Identification and Clearance using Ground-Penetrating Radar (GPR)
3. SVI Investigation (installation of sub-slab soil vapor points and SVI investigations)
4. Groundwater Characterization (monitoring well installation and sampling)
5. Characterization and Disposal of Investigation Derived Waste
6. Analytical Data Quality Evaluation
7. Base Map Development and Site Survey

2.2.1 Property Access and Permit Acquisition

Prior to conducting field activities, HRP will work to obtain access from off-site property owners for completion of sub-slab SVI investigations. HRP will identify and gather contact information for off-site property owners using available resources including online municipal databases. It is understood the NYSDEC will prepare property access agreements to property owners including cover letters explaining investigation purposes and procedures. Property access solicitations will be reviewed and sent by NYSDEC. If sufficient responses are not received to the access letters, HRP may conduct a site visit to solicit access from property owners.

All permits necessary to complete the intrusive work will be obtained by the drilling contractor or HRP prior to commencement of Site activities. This will include New York City Department of Transportation (NYCDOT) "sidewalk opening" permits.

2.2.2 Underground Utility Clearance and Ground Penetrating Radar

Prior to implementing any intrusive activities, a utility clearance will be conducted. HRP will rely upon multiple lines of evidence to ensure to the maximum extent practicable that subsurface features are identified prior to commencement of intrusive work.

HRP will mark sampling locations prior to installation and contact public utility clearance services to mark out the utilities prior to the survey. The drilling contractor will request utility mark outs through NYS Code Rule 753/Dig Safe System. The dig safe system is limited to public right-of ways and will only identify utilities entering private property rather than utilities present at the monitoring well installation location.

HRP will utilize a qualified subcontractor to conduct a GPR survey to attempt to locate any privately installed underground structures or utilities to ensure boring areas are clear of obstructions and identify any other potential AOCs. The GPR survey and underground utility markout will be completed within a minimum 10-ft radius of each monitoring well location. Monitoring well and soil boring locations are depicted on **Figure 2**.

GPR is a non-destructive and non-intrusive geophysical exploration technique that uses radar waves to detect subsurface objects, such as tanks, drums and piping. The GPR is also capable of detecting discontinuities in the subsurface materials indicative of excavated and backfilled areas, such as those associated with possible UST graves. The objective of performing this survey is not only to make subsurface investigation as safe as possible for the field staff while protecting utilities, but also to identify possible sources and migration pathways (utility corridors, etc.). All anomalies identified during the GPR survey will be marked out in the field.

If necessary, the upper five feet of the monitoring well location will be cleared of any underground utilities by non-mechanical means, such as a hand-digging methods.

2.2.3 Site Walkthrough, Assessment of Existing Monitoring Wells in ROW, Soil Boring Installation and Waste Characterization Sampling

It is anticipated the Site walkthrough, monitoring well assessment, soil boring installation, and waste characterization sampling described below will be completed in the same mobilization as the GPR survey described in **Section 2.2.2**.

<u>Site Walkthrough and Monitoring Well Assessment</u>

A walkthrough will be conducted to confirm conditions of off-site wells MW-1, MW-2, DPE-02/MW-16, DPE-03 (MW-27), LMW-01, MW-18, OB003, OB004, MW005, and MW008 (**Figure 2**). If located, those wells will be assessed for continued groundwater monitoring usage and LNAPL delineation. The assessment will consist of the following:

- Visual inspection of construction (to the extent possible). The goal of the visual inspection will be to identify any damage to the well casing, well-pad, or manhole cover which may be indicative of damage to the well which would prevent recovery activities or result in well conditions being non-representative of aquifer conditions.

- Measurements of the wells will also be collected for comparison to well construction details including, but not limited to, depth-to-bottom (i.e. total well depth), presence of sediment at the bottom of the well, well diameter, top of casing proximity to land surface, well pad dimensions, manhole dimensions, depth to water and/or LNAPL. An interface probe will be implemented for purposes of measuring depth to LNAPL, depth to water, and total well depth.

Soil Boring Installation

Soil borings will be equidistantly spaced along the Kent Avenue western property boundary of the Site in the sidewalk/ right of way to determine subsurface stratigraphy and hydrogeology, its impact on LNAPL transport, determine construction of proposed monitoring wells, and collect samples for waste characterization. Up to ten soil borings will be installed in proposed recovery/monitoring well locations depicted on **Figure 2**. Soil borings will be installed using a motorized drill rig and the direct push method to a depth of 10 ft below groundwater interface or a maximum depth of 30 ft bg. Soils will be sampled using 5-ft microcore or macrocore sleeves and logged by an HRP geologist for grain size, moisture, color, odor, presence of anthropomorphic materials, and presence of NAPL. Soils will be screened continuously with a calibrated photo-ionization detector (PID).

If impacts are observed above the water table at any of the 10 soil boring locations, up to one grab soil sample will be collected per borehole for laboratory analysis. Up to soil 10 samples, plus up to three QA/QC samples (duplicate, matrix spike, matrix spike duplicate) will be collected and submitted for laboratory analysis of the following parameters:

- TCL VOCs+10 via EPA Method 8260.
- TCL SVOCs+20 via EPA Method 8270.

Duplicate, matrix spike, matrix spike duplicate samples (one of each) will be analyzed at a frequency of one per 20 samples. Sample locations and totals are summarized on **Table 2** and laboratory QA/QC details are summarized on **Table 3**.

Drilling equipment will be decontaminated between drilling locations as described in **Section 2.2.7**. All soil cuttings generated during the installation of direct push soil borings will be returned to the borehole in the reverse order of which it was removed to match original stratigraphy. Off-site disposal of waste is not anticipated during the initial mobilization.

Waste Characterization Sampling

The initial mobilization will also include the collection of soil, groundwater, and LNAPL samples for waste characterization purposes.

Soil samples will be collected from each of the ten soil borings along Kent Avenue. Soil will be collected from each 5 ft microcore/macrocore, so as to be representative of the full depth of each of the soil borings. Up to one composite soil sample will be collected for waste characterization purposes. The sample will be transported on-ice under standard chain of custody procedures to a NYSDOH ELAP certified laboratory for analysis of the following parameters:

- Ignitability
- Corrosivity
- Reactivity (cyanide and sulfide)
- Toxicity Characteristic Leaching Procedure (TCLP) VOCs via EPA Method 8260
- TCLP SVOCs via EPA Method 8270
- TCLP RCRA 8 Metals via EPA Method 6010D & 7470
- TCLP Pesticides via EPA Method 8081
- TCLP Herbicides via EPA Method 8151
- PCBs via EPA Method 8082

LNAPL and groundwater samples collected for waste characterization will be collected as grab samples using dedicated polyethylene bailers or a peristaltic pump and dedicated tubing. Up to one LNAPL sample and one groundwater sample will be collected for waste characterization purposes. The waste characterization LNAPL and groundwater samples collected from proposed monitoring wells in the Kent Avenue sidewalk will be collected in a separate mobilization following monitoring well installation but prior to monitoring well development. Samples will be transported on-ice under standard chain of custody procedures to a NYSDOH ELAP certified laboratory.

Waste characterization groundwater samples will be analyzed for the following parameters:

- TCL VOCs+10 via EPA Method 8260
- TCL SVOCs+20 via EPA Method 8270
- PCBs via EPA Method 8082
- RCRA 8 Metals via EPA Method 6010D & 7470

Waste characterization LNAPL samples will be analyzed for the following parameters:

- TCL VOCs+10 via EPA Method 8260
- TCL SVOCs+20 via EPA Method 8270
- PCBs via EPA Method 8082
- Petroleum fingerprint via EPA Method 8015

LNAPL sampling is expected to be performed once for purposes of LNAPL fingerprinting and waste characterization. If LNAPL is observed during a gauging or sampling event in an existing well where LNAPL was not previously observed, a sample will be collected for the parameters listed above.

Sample matrices, locations, and laboratory analytical methods are summarized in **Table 2** and QA/QC details are summarized in **Table 3**. Waste characterization sample analyses and frequency may be revised based on discussions with the waste disposal facility.

2.2.4 Groundwater Characterization

To evaluate off-site groundwater quality and obtain groundwater flow information, up to three overburden groundwater monitoring wells are proposed for installation in off-site locations along Kent Avenue. The proposed locations were selected based on a localized southeastern groundwater flow direction as determined by previous on and off-site investigations and the historical occurrence of LNAPL in wells west and northwest of the Site. The proposed off-site monitoring well locations are depicted on **Figure 2**.

2.2.4.1. Recovery and Monitoring Well Installation

Up to three 4" diameter recovery wells or up to three 2" diameter monitoring wells will be installed for delineation of impacts, subject to variation based on field conditions. Recovery/monitoring wells will be installed to a maximum depth of 30 ft bg. The well construction will be dependent upon field screening results and observations during soil boring installation (described in **Section 2.2.3**). If signs of LNAPL are present in the soil at any proposed well installation location, including but not limited to, soil staining, visible product, odor, or elevated PID readings, a recovery well (4-inch diameter well) will be installed at the given location. If no signs of LNAPL are apparent, these monitoring wells will be installed as 2-inch diameter wells. Proposed monitoring well locations are depicted on **Figure 2**. Final locations will be determined based on field observations and the GPR survey.

The recovery/monitoring wells are to be constructed of Schedule 40 PVC solid well pipe riser and a 10-foot PVC 10-slot screen for monitoring wells and a 10-foot 20-slot screen for recovery wells. The final depth of the monitoring/recovery wells will be dependent on field observations but should be placed such that the screened interval intercepts the water table, taking into account the possibility for seasonal and tidal fluctuations. The wells will be installed with filter pack consisting of #2 sand to 2-feet above the top of the screened interval and 2-feet of bentonite seal directly over the filter pack. Grout will be a minimum of 1-foot thick. Soil which does not display any signs of impacts (staining, odor, elevated PID readings) or sand may be used to backfill the remaining annular space. The wells will be finished with flush mounted steel manhole covers.

All equipment will be appropriately decontaminated between sampling locations, as described in **Section 2.2.7**. Any soil cuttings generated by the monitoring well installation will be containerized for off-site disposal as discussed in **Section 2.2.8**.

2.2.4.2. Well Development

All purge water obtained during well development will be containerized in appropriately labeled 55-gallon drums and disposed of in accordance with NYSDEC DER-10. If impacts are observed, the contaminated groundwater will be segregated and handled as described in **Section 2.2.6**. All sampling equipment will be appropriately decontaminated between sampling locations or disposed of after one-time use.

Monitoring/recovery wells will be developed by pumping and surging on the same day as installation at wells where waste characterization has been completed. At wells where waste characterization has not been completed, development will be completed during a later mobilization by the same methods. Development will be deemed complete upon removal of 6 to 10 well volumes and when a turbidity reading of 50 Nephelometric Turbidity Units (NTUs) or less is achieved or purged water is visibly clear. The same criteria will be adhered to for redevelopment of existing monitoring wells, if needed due to suspected sediment in the bottom of the well (depth-to-bottom not consistent with original design details).

Any needed repairs to manhole covers or well pads of existing wells will be made concurrently with completion of newly installed wells.

All equipment will be appropriately decontaminated between sampling locations. Any soil cuttings and purge water derived during well installation and development will be containerized in appropriately labeled 55-gallon drums and disposed of in accordance with NYSDEC DER-10 on the day of generation. No waste associated with this investigation will be stored on-site or on the sidewalk.

2.2.4.3. Monitoring Well Sampling and Gauging

Groundwater samples will be collected from the three newly installed off-site wells a minimum of seven days after well development has been completed. An oil/water interface probe will be used to measure any product thickness and depth to water in the newly installed and several existing monitoring wells (identified in table below). Depth to groundwater measurements will be collected from the newly installed monitoring wells to the nearest 0.01 foot from the surveyed points (the survey is discussed in **Section 2.2.10**) prior to sampling activities. The data will be used to construct a groundwater contour map to determine the direction of groundwater flow and the hydraulic gradient around the Site. The following table outlines which existing wells are to be gauged.

Monitoring Well ID	Associated Site	Monitoring Well Diameter (inches)	Screened Interval (feet below grade)	Gauge for Product and Depth to Water
MW-1	Former NY Cleaning and Dyeing	2	5-20	X
MW-2	Former NY Cleaning and Dyeing	2	10-28	X
LMW-01	Kent Avenue Central Shop	2	14-24	X
MW-18	Kent Avenue Central Shop	Unknown	Unknown	X
DPE-02 (MW-16)	Kent Avenue Central Shop	2	4-14	X

DPE-03 (MW-27)	Kent Avenue Central Shop	Unknown	Unknown	X
OB003	Former Arkansas Chemical Co.	2	7-17	X
OB004	Former Arkansas Chemical Co.	2	7-17	X
MW005	Former Arkansas Chemical Co.	2	7-17	X
MW008	Former Arkansas Chemical Co.	Unknown	Unknown	X

Groundwater samples will be collected in accordance with EPA low-flow groundwater sampling procedures and will be submitted to a NYSDOH ELAP and NYSDEC approved laboratory for analysis of total compound list (TCL) VOCs+10 by EPA Method 8260D and TCL SVOCs+20 by EPA Method 8270. If LNAPL is encountered, up to 3 samples of the LNAPL will be collected and submitted for fingerprint analysis by EPA Method 8015 to determine the composition and evaluate the potential source of the material.

Up to 8 groundwater samples (3 primary, 5 QA/QC) will be collected for VOC and SVOC analysis. Duplicate, matrix spike, matrix spike duplicate samples (one of each) will be analyzed at a frequency of one per 20 samples. Field blanks will be analyzed at a frequency of 1 per 20 samples, and trip blanks to accompany every shipment. Sample locations and totals are summarized on **Table 2** and laboratory QA/QC details are summarized on **Table 3**.

2.2.5 Soil Vapor Intrusion Investigations

In an effort to assess the migration of gaseous vadose zone contamination and verify previous data, HRP proposes to conduct sub-slab and indoor air SVI investigations in up to two off-site structures. General locations selected for SVI investigations were selected based on soil vapor and groundwater analytical results from previous on- and off-site investigations and are depicted on **Figure 2**.

2.2.5.1. Sub-Slab SVI Investigations

Up to two off-site structures will be selected for off-site SVI investigations based on responses to access requests and consultation with the NYSDEC and the NYSDOH. A selection of properties proposed for solicitation are depicted on **Figure 2**. The SVI structure investigations will include the completion of a NYSDOH Indoor Air Quality Questionnaire and Building Inventory.

Sub-slab soil vapor points will be installed and sampled in accordance with NYSDOH's *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006* and HRP's Generic FAP, on file with the NYSDEC. Prior to sampling a leak test will be performed using a tracer gas and a minimum of three tubing volumes of air will be purged from the vapor point. Indoor and outdoor air samples will be collected simultaneous to sub-slab samples and will be placed at a height corresponding to the average breathing level (i.e., approximately five feet above the ground surface). All SVI air and sub-slab soil vapor samples will be collected using 6-liter summa canisters fitted with 24-hour regulators and analyzed for VOCs via EPA Method TO-15.

It is anticipated up to two sample sets will be collected per off-site structure. Sample sets include: one first floor indoor air sample, one basement indoor air sample, 1 sub-slab soil vapor sample, and one outdoor air sample. Duplicate sub-slab soil vapor samples will be collected at a frequency of one per 20 air samples. Final locations of sub-slab samples, indoor air, and outdoor air samples for the SVI investigations will be determined in the field. Sample locations and totals are summarized on **Table 2** and laboratory QA/QC details are summarized on **Table 3**.

2.2.6 Sample Handling Procedures

Nitrile gloves will be worn at all times by personnel collecting and handling the samples. All non-disposable equipment and tooling used for sampling will be properly decontaminated between sampling locations and intervals. Decontamination procedures are described in **Section 2.2.7**.

2.2.7 Decontamination Procedures

Non-dedicated sampling equipment (i.e., submersible pumps, water level indicators, etc.) will be subject to decontamination procedures prior to each sample collected to reduce the potential for cross-contamination, as described in the Generic FAP on file with NYSDEC. The decontamination procedures will include the use of a scrub wash with a solution consisting of Alconox® detergent and potable water followed by a rinse with DI water. The decontaminated equipment will be stored in clean environments (i.e., the manufacturer's storage case). Decontamination fluids will be properly labeled and securely stored in a designated waste-container staging area.

2.2.8 Disposal of Investigation Derived Waste

Investigation derived waste (IDW) that is generated from the monitoring well installation, the development of monitoring wells, and LNAPL recovery shall be handled and disposed of in accordance with NYSDEC DER-10. No waste associated with this investigation will be stored on-site or in the right of way. The drilling subcontractor will be responsible for supplying the equipment and materials necessary for the proper handling and storage of the IDW, such as DOT-approved 55-gallon drums, roll-off containers and/or holding tanks. All containers will be labeled and stored in accordance with applicable NYSDEC regulations. Soil, groundwater, and LNAPL will be characterized through sampling in accordance with requirements of applicable disposal facilities as is described in **Section 2.2.4**.

Soil shall be handled and disposed of in accordance with DER-10. If off-site disposal of IDW is required, it will be disposed of or treated according to applicable local, state, and federal regulations. Soils from the investigation may be disposed within the monitoring well borehole as backfill over the grout seal provided the cuttings do not exhibit staining, odors, or elevated PID readings.

It is anticipated that purge water generated during the development and sampling of the monitoring wells will require off-site disposal based on the previous off-site data. Decontamination fluids will be containerized separately from other IDW, and any decontamination fluids that do not exhibit

evidence of contamination will be containerized separately from those exhibiting evidence of contamination.

LNAPL will be containerized and removed from the site for disposal at the conclusion of each LNAPL recovery event in accordance with DER-10.

2.2.9 Analytical Data Quality Evaluation

This Work Plan and the associated site-specific QAPP detail the data quality objectives and analytical requirements needed for this WA. All quality assurance protocols will be provided in the Generic QAPP.

During the final Work Plan review period, the site-specific QAPP and Work Plan will be reviewed and modified according to NYSDEC requirements and comments. Once the plans are finalized, deviations, if required, from protocols specified in the plans will be approved in advance by NYSDEC. As required, the selected analytical laboratory will maintain NYSDOH ELAP certification in all categories of USEPA Contract Laboratory Program (CLP) and Solid and Hazardous Waste analytical testing for the duration of the project.

The ELAP certified laboratory will supply all required data deliverables (USEPA CLP and NYSDEC ASP deliverable format) to enable the data to be validated. All environmental data will be submitted electronically in a specified format named 'NYSDEC' in accordance with the data submission procedures outlined on the NYSDEC's web site (http://www.dec.ny.gov/chemical/62440.html).

Upon receipt of the sample data, the validation contractor will quantitatively and qualitatively validate the laboratory data. The validation of the analytical data will be performed according to the protocols and QC requirements of the analytical methods, the CLP National Functional Guidelines for Organic and Inorganic Data Review (February 1994), the USEPA Region II CLP Data Review SOP, and the reviewer's professional judgment.

2.2.10 Survey of Investigation Locations

Following installation, soil borings and monitoring wells will be surveyed by a New York State licensed land surveyor. Field surveying will include establishing project horizontal control and the collection of monitoring wells and other relevant Site features. Coordinates and elevations provided to HRP by the surveyor will be plotted on an aerial image base map of the Site. Monitoring well top of casing elevations will be recorded using a vertical datum to within an accuracy of plus or minus 0.01 feet. A notch will be etched in all interior casings, or a permanent black mark (as historically used), to provide a reference point for all future groundwater elevation measurements. All location data collected by HRP or the licensed surveyor will be included on site base maps and entered into the NYSDEC's EQuIS database.

2.3 Site Characterization Report

2.3.1 Electronic Data Delivery

In addition to appropriate data summary tables and boring logs included in the report, all environmental data will be submitted electronically in a specified Electronic Data Deliverable (EDD) format named in accordance with the data submission procedures outlined on the NYSDEC's web site (http://www.dec.ny.gov/chemical/62440.html).

2.3.2 Site Characterization Report

The Site Characterization Report (SCR) will provide a description of the field activities, present data collected during field characterization, present a physical description of the Site including geology and hydrogeology, and provide an analysis and interpretation of the available data in the context of existing Site conditions. The SCR will include tabulated laboratory analytical results, Site maps and a discussion of contaminant concentrations, including a comparison to NYSDEC Standards, Criteria and Guidelines as described in Section 3.13 of DER-10.

The SCR prepared as part of this assignment will also provide a summary of the general nature of contamination on the Site to the extent investigated by the SC including, without limitation, the numbers of areas of concern requiring further investigation and/or remediation and any significant events or seasonal variation which may have influenced sampling procedures or analytical results. A description of each area of concern identified, including dimensions, suspected and actual contamination and suspected source of discharge or disposal recommendations for either additional investigation in the SC, remediation or no further action for each area of concern. The submitted report will include the report text, appropriate tables, figures, photographs, data summary tables, and boring logs in a PDF format. The electronic file will contain 'bookmarks'. In addition, one hard copy of the report will be sent.

Since SVI and/or other investigation activities will be performed on private property, two versions of the SCR will be submitted, a standard SCR, and a version in which addresses of off-site properties have been redacted.

3.0 GREEN AND SUSTAINABLE REMEDIATION BEST MANAGEMENT PRACTICES

Through the course of the SC, HRP will implement Green and Sustainable Best Management Practices (BMPs) to reduce negative impacts to air, water, solid waste, etc.

In consultation with NYSDEC, quantifiable impact reductions achieved by green and sustainable remediation BMPs implemented during the SC investigations (e.g. tons of carbon reduced, gallons of fuel saved, pounds of waste reduced) may be included in Site fact sheets to promote public awareness of NYSDEC green and sustainable BMPs.

Green and Sustainable Remediation BMPs to be implemented as part of this project are summarized below, organized by BMPs implemented in project planning and field work phases of work.

Project Planning BMPs

BMP 1) Efforts will be made to schedule Site visits and field work to reduce energy consumption and air emissions associated with mobilizations to and from the Site. The following BMPs will be implemented related to HRP mobilization:

- BMP 1a) Field work schedules will be consolidated by coordinating with contractors and property owners. Specifically, GPR work will be performed in the same mobilization as intrusive work at the Site. Property access will be coordinated to conduct sub-slab SVI investigations in the fewest mobilizations possible (i.e. if possible, the 2 sub-slab SVI locations will be scheduled to be completed in one mobilization from HRP's office as opposed to two separate mobilizations).
- BMP 1b) Travel for Site visits which do not require substantial sampling and monitoring equipment (e.g., visits to confirm Site access, off-site property access solicitations) will utilize mass-transit to reduce energy use and emissions associated with travel in passenger vehicles.
- BMP 1c) When two or more HRP personnel are involved in a trip to and from the Site which requires a passenger vehicle (i.e., cannot be completed by mass-transit), personnel will "car-pool" by sharing a vehicle, reducing energy consumption and emissions associated with taking multiple vehicles to the Site.

Field Work BMPs

BMP 2) Install monitoring wells using direct push drilling methods instead of hollow stem auger methods to reduce the generation of waste drill cuttings and reduce drill rig operation time.

BMP 3) When not in use, vehicles, trucks, drill rigs, and other equipment will be shut off to reduce energy consumption and emissions related to engine idling.

BMP 4) Dedicated plastic tubing will be installed to collect groundwater samples from permanent monitoring wells, reducing waste generated by using new tubing if monitoring wells are sampled during future events.

BMP 5) Waste cardboard generated from labware (sample jars, bottle ware, and summa cannisters) will be reused or recycled to reduce waste.

4.0 SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

This site-specific QAPP has been prepared as a companion to accompany the Generic QAPP for the standby subcontract prepared by HRP for the NYSDEC under Standby Contract No. D009808. The purpose of the QAPP is to specify QA/QC procedures for the collection, analysis, and evaluation of data that will be legally and scientifically defensible.

4.1 Site-Specific Sampling

Groundwater and air samples will be collected during this off-site investigation. Detailed sampling procedures are detailed in Section 4.0 of the Generic QAPP. Matrix types, number of samples (including QA/QC) and analytical details are summarized in **Table 3**. Proposed sample locations are depicted on **Figure 2.**

4.2 Data Quality Assessment and Usability

Data quality objectives for the 376-378 Flushing Avenue SC are focused on the characterization of releases of hazardous substances impacting off-site groundwater and soil vapor.

To achieve these objectives, QA/QC measures will be implemented throughout the SC to provide input as to the validity and usability of data generated through soil, groundwater, soil vapor and indoor air sampling. The procedures for data QA/QC management includes field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; auditing; data reduction, validation, and reporting; corrective action requirements; and QA reporting specific to the analyses performed by the laboratory under subcontract to HRP. **Table 3** lists the sample containers, preservation, and holding time requirements for the parameters specific to this Site. This table will be referenced by field personnel.

For all data generated during the SC, a Category B Data package and DUSR will be prepared to provide a thorough evaluation of analytical data utilizing third-party data validation. Environmental Data Services, Inc. will be the third-party data validator for this project.

5.0 PROJECT MANAGEMENT

HRP has the responsibility of the overall management of this project and will respond to any NYSDEC requests. A proposed project schedule, key milestones, key project personnel, and project-specific subcontractors follow.

5.1 Project Schedule and Key Milestones

The proposed project schedule for this work assignment is outlined below. Key milestones are identified to monitor work progress. It is anticipated monitoring well and soil vapor point installation work will be scheduled to be completed during the heating season, in the same mobilization as sub-slab SVI investigations. The following milestones will be applicable for this project:

CATEGORY	TASK	START	END
Task 1 – Preliminary Activities	Work Plan, QAPP, HASP (Includes Department Review and Approval)	01/01/2024	03/28/2024
Task 2 – Investigation, Environmental Sampling, and Implementation	Off-site Property Access and NYCDOT Permit Acquisition	05/06/2024	05/17/2024
	Groundwater Monitoring Well Install and Sampling	05/20/2024	05/31/2024
	Soil Vapor Sampling, and SVI (Heating Season)	11/15/2024	3/31/2025
Task 3 – Site Characterization Report	Report Preparation and Submittal	04/01/2025	07/01/2025

5.2 Key Project Personnel

A list of the project personnel of the prime consultant and subcontractors responsible for performance of the investigation has been submitted to the NYSDEC for approval. Primary project staff are listed in the table below.

Personnel	Company	Title for this Work Assignment	Responsibility
Patrick Montuori, PG (Project Manager)	HRP Associates, Inc. (Prime Consultant)	Project Manager	Overall management of the WA
Bryan Sherman, CSP (Project Manager)	HRP Associates, Inc.	Office Health and Safety Manager	Approval of HASP and responsible for overall health and safety issues with the WA
Michael Varni (Senior Project Geologist)	HRP Associates, Inc.	Corporate QA/QC Officer	Responsible for QA/QC on the WA
Elliott Jackson (Project Consultant)	HRP Associates, Inc.	Field Manager and Site Health & Safety Officer	Responsible for the on-site sampling and investigative tasks

Subcontractors for this project will include:

- GPR – American Geophysics
- Drilling – Island Pump & Tank
- Laboratory – ELAP certified laboratory selected through NYSDEC call-out contract
- Data Validation – Environmental Data Services, Inc.
- IDW Disposal - Island Pump & Tank

6.0 REFERENCES

AMC Engineering PLLC, December 2020, Final Engineering Report, NYSDEC BCP Site No. C224264.

AMC Engineering PLLC, March 2021, 2020, Periodic Review Report, Reporting Period: 12/21/2020 to 04/23/2022, NYSDEC BCP Site No. C224264.

Caldwell, D.H., et.al., 1986, Surficial Geologic Map of New York, New York State Museum – Geological Survey, Map and Chart series No. 40.

Fisher, D.W., et. al., 1970, Geologic Map of New York, New York State Museum and Science Service, Map and Chart Series No. 15.

Equity Environmental Engineering, August 2015, Phase 1 Environmental Site Assessment Report, NYSDEC BCP Site No. C224264.

Environmental Business Consultants, April 2019, Evaluation of Existing Conditions, Former Arkansas Chemical Co. Site, 755.

Environmental Business Consultants, May 2017, Remedial Investigation Report, NYSDEC BCP Site No. C224264.

LiRo Engineers, Inc., June 2022, Semi-Annual Monitoring Report for Monitoring Period: August 2021 to January 2022, Spill No. 9601072 and PBS No. 2-456330.

Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/. Accessed 2/1/24.

New York State Department of Environmental Conservation, Division of Environmental Remediation, DER-10 Technical Guidance for Site Investigation and Remediation, May 2010.

New York State Department of Environmental Conservation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, October 2020.

New York State Department of Health, Center for Environmental Health, Bureau of Environmental Exposure Investigation, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, Updated May 2017.

P.W. Grosser Consulting Engineer and Hydrogeologist, PC, April 2014, Remedial Investigation Report, NYSDEC BCP Site No. C224172.

P.W. Grosser Consulting Engineer and Hydrogeologist, PC, December 2014, Final Engineering Report, NYSDEC BCP Site No. C224172.

United States Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation, National Functional Guidelines for Inorganic Data Review, January 2017.

United States Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation, National Functional Guidelines for Organic Data Review, January 2017.

United States Geological Survey (USGS) "Bedrock-Surface Elevation and Overburden Thickness Maps of the Five Boroughs, New York City, New York" Data Report 1176.

FIGURES

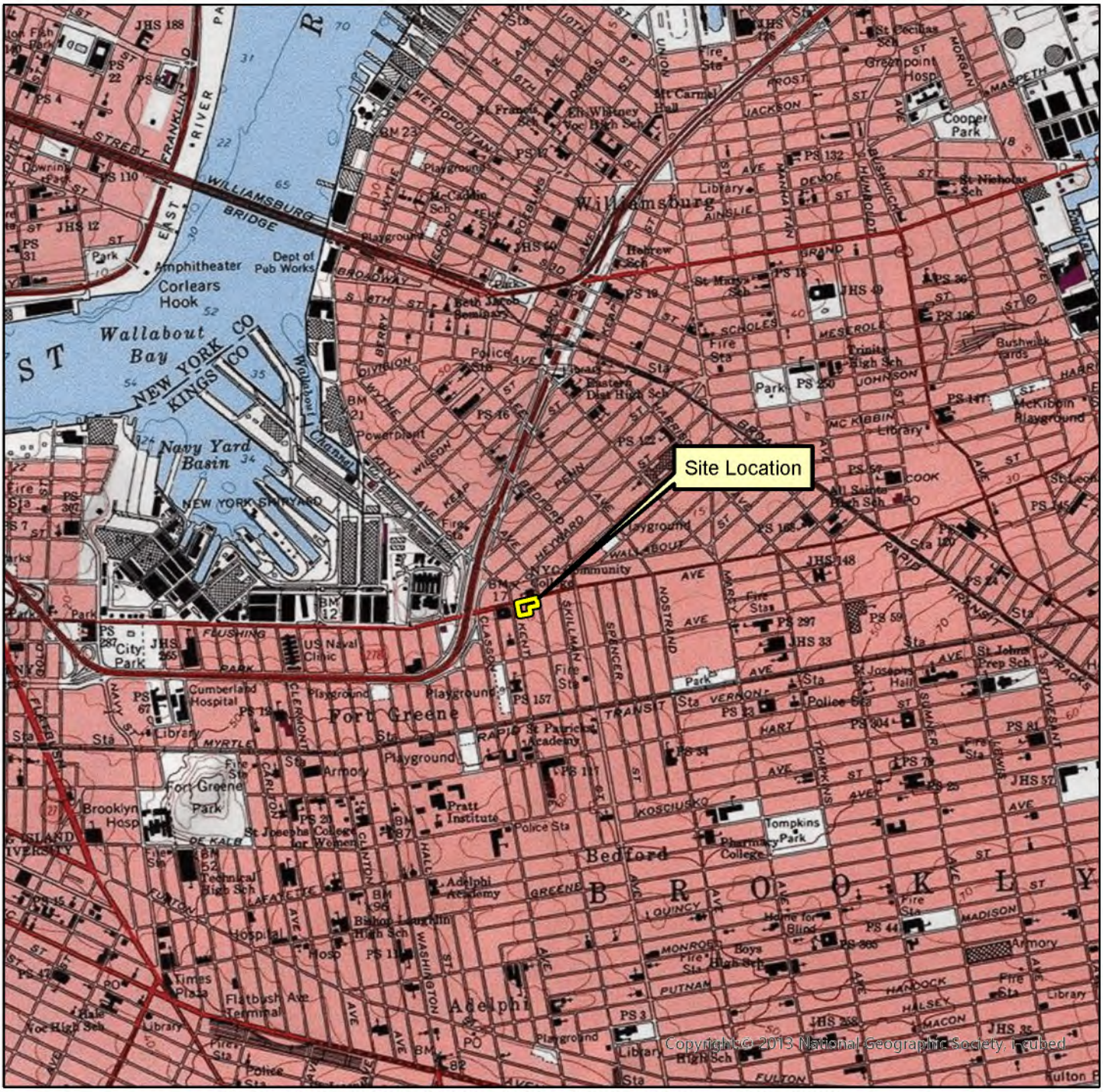


Figure 1
Site Location
Former NY Cleaning and Dyeing Off-Site
(Site #C224264A)
376-378 Flushing Ave
Brooklyn, New York
HRP # DEC1038.P2

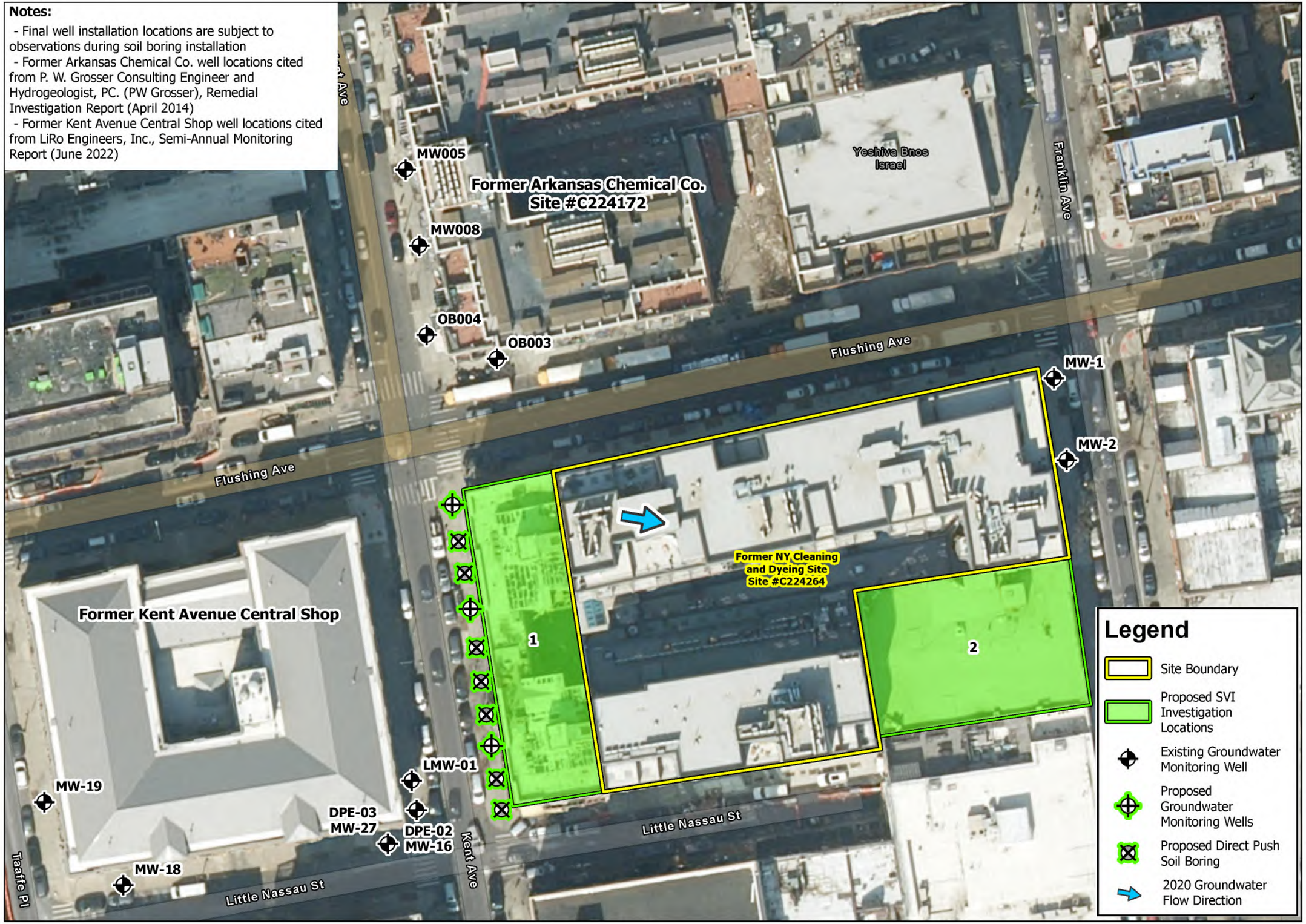
USGS Quadrangle Information
Quad ID: 42078-G3
Name: Brooklyn, New York
Date Rev: 1976
Date Pub: 1995

HRP
MOVE YOUR ENVIRONMENT FORWARD
ONE FAIRCHILD SQUARE
SUITE 110
CLIFTON PARK, NY 12065
(518) 877-7101
HRPASSOCIATES.COM

Path: S:\Data\N\NYDEC - NYSDEC\NEW YORK\VARIOUS NYC\DEC1038P2 - Region 2 NYC Sites\GIS\376-378 flushing ave\Flushing Ave 376 378\Flushing Ave 376 378.aprx

Notes:

- Final well installation locations are subject to observations during soil boring installation
- Former Arkansas Chemical Co. well locations cited from P. W. Grosser Consulting Engineer and Hydrogeologist, PC. (PW Grosser), Remedial Investigation Report (April 2014)
- Former Kent Avenue Central Shop well locations cited from LiRo Engineers, Inc., Semi-Annual Monitoring Report (June 2022)



HRP
MOVE YOUR ENVIRONMENT FORWARD
ONE FAIRCHILD SQUARE
SUITE 110
CLIFTON PARK, NY 12065
(518) 877-7101
HRPASSOCIATES.COM

North

0 25 50 Feet

Revisions					
No.					
Date					

Designed By:	Drawn By:	Reviewed By:
PWM	CMS	PWM

Issue Date:	Project No:	Sheet Size:
1/30/2024	DEC1038.P2	11x17

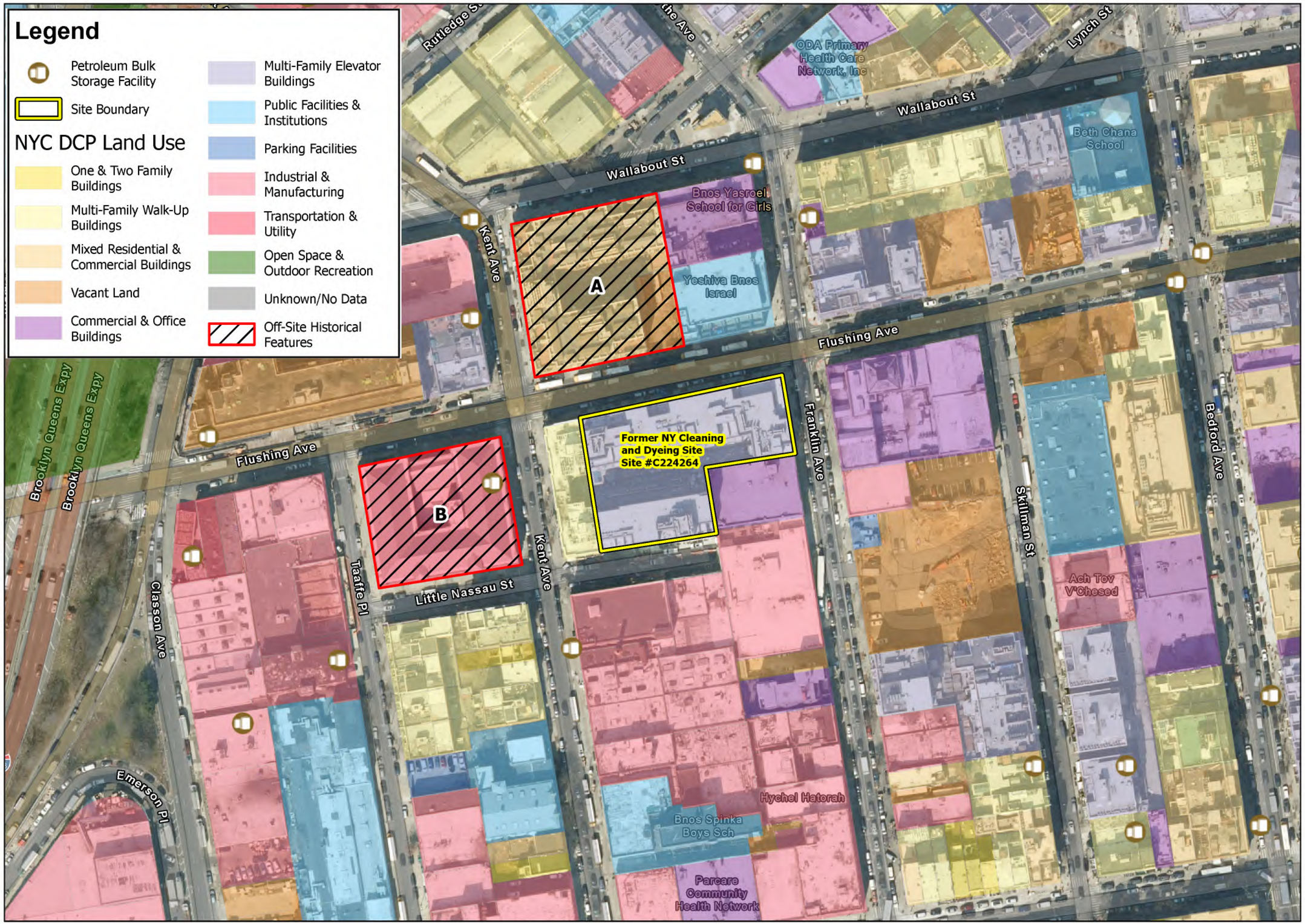
Site Plan and Proposed Investigation Locations

Former NY Cleaning and Dyeing Off-Site (Site #C224264A) 376-378 Flushing Ave Brooklyn, New York

Figure No.

2

Path: S:\Data\NNYDEC - NYSDEC\NEW YORK\VARIOUS NYC\DEC1038P2 - Region 2 NYC Sites\GIS\376-378 flushing ave\Flushing Ave 376 378\Flushing Ave 376 378.aprx



HRP
MOVE YOUR ENVIRONMENT FORWARD
ONE FAIRCHILD SQUARE
SUITE 110
CLIFTON PARK, NY 12065
(518) 877-7101
HRPASSOCIATES.COM

North

0 60 120
Feet

Revisions					
No.					
Date					

Designed By:	Drawn By:	Reviewed By:
PWM	CMS	PWM

Issue Date:	Project No:	Sheet Size:
1/29/2024	DEC1038.P2	11x17

Surrounding Property Use

Former NY Cleaning and Dyeing Off-Site (Site #C224264A)
376-378 Flushing Ave
Brooklyn, New York

Figure No.
3

Path: S:\Data\NYDEC - NYSDEC\NEW YORK\VARIOUS NY\DEC1038P2 - Region 2 NYC Sites\GIS\376-378 flushing ave\Flushing Ave 376 378\Flushing Ave 376 378.aprx

TABLES

Table 1
Historic Property Use and Relevant Regulatory Findings

Former New York Cleaning and Dyeing Off-Site
NYSDEC Site # C224264A

Map ID	Distance from Site Boundary (ft)	Address	Historic Use	Years Listed	Relevant Regulatory Findings
On-Site					
-	N/A	376-378 Flushing Ave (Site No. C224264) (Includes 372, 376-380 Flushing Ave listings)	Paper Company	1935	NYSDEC Site No. C224264 NY Cleaners - Historic Cleaner; Historic LQG Generator F003, F005
			Parking /Auto Repair Garage with Two Identified Gasoline Tanks	1935-2017	
			Worthy Paint and Varnish Co.	1940	
			NY Cleaners/ NY Cleaning & Dye Co./ Consolidated Laundries	1940-2017	
			Rapid Industrial Plastics	1940-2017	
			Trucking Co and Maintenance	1940-2017	
			Exclusive Door Co.	2004-2014	
			Retail	1992-2017	
			Garages	1928-1949	Gasoline Underground Storage Tanks
			Distributor, Ice Cream Co.	1949	
Off-Site					
A*	163	74 Wallabout St	Former Arkansas Chemical Co.	1934	NYSDEC Site No. C224172, Spill 1213721 , BCP, UST VOCs, TCE, SVOCs, metals
B*	130	350 (356) Flushing Ave	Kent Ave Central Repair Shop	-	Site ID: 161604, Spill No. 9601072, UST petroleum release
			Department of Street Cleaning (3 Underground Gasoline Tanks)	1918-2007	

AST= Aboveground Storage Tank
BCP = Brownfield Cleanup Program
UST=Underground Storage Tank
LQG = Large Quantity Generator
VOCs= Volatile Organic Compounds
TCE = Trichloroethene
SVOCs = Semi-volatile Organic Compounds
F003= Spent Nonhalogenated Solvents
F005 = Spent Nonhalogenated Solvents
*= Shown on Figure 3

Table 2
Sampling Summary
Site Characterization

Former New York Cleaning and Dyeing Off-Site
NYSDEC Site # C224264A
376-378 Flushing Avenue
Brooklyn, NY

Activity/ Matrix	Number of Sample Locations	Proposed Sample Locations	Number of Samples to be Collected	Analyses
Groundwater	3	Groundwater samples are to be collected from 3 newly installed monitoring wells. 1 additional waste characterization groundwater sample is to be collected prior to well development.	8 (3 regular, 5 QA/QC)	Investigation Samples: TCL VOCs + 10 by EPA Method 8260D TCL SVOCS + 20 by EPA Method 8270 QA/QC: 1 duplicate, 1 MS, 1 MSD, 1 field blank, 1 trip blank per 20 samples
			1	Waste Characterization Samples: TCL VOCs+10 via EPA Method 8260 TCL SVOCs+20 via EPA Method 8270 PCBs via EPA Method 8082 RCRA 8 Metals via EPA Method 6010D & 7470
Soil	10	10 locations along Kent Avenue sidewalk west of Site. Composite samples to be collected for waste characterization.	1	Ignitability Corrosivity (pH) Reactivity (Cyanide and Sulfide) TCLP VOCs via EPA Method 8260 TCLP SVOCs via EPA Method 8270 TCLP RCRA 8 Metals via EPA Method 6010D & 7470 TCLP Pesticides via EPA Method 8081 TCLP Herbicides via EPA Method 8151 PCBs via EPA Method 8082
	10	If impacts are observed at any of the 10 soil boring locations along Kent Avenue, grab soil samples are to be collected.	up to 13 (up to 10 regular, 3 QA/QC)	TCL VOCs+10 via EPA Method 8260 TCL SVOCs+20 via EPA Method 8270
LNAPL	3*	LNAPL identified in exisitng off-site wells will be collected via bailing for petroleum footprint analysis only. LNAPL to be collected via bailing from newly installed wells for waste characterization.	3*	Total Petroleum Hydrocarbon (Petroleum Fingerprint) by EPA Method 8015
			1*	TCL VOCs+10 via EPA Method 8260 TCL SVOCs+20 via EPA Method 8270 PCBs via EPA Method 8082 Total Petroleum Hydrocarbon (Petroleum Fingerprint) by EPA Method 8015
Soil Vapor	3	SVI investigations at Properties 1 and 2 (see Figure 2). Up to 2 sample sets per property will be collected. Sample sets include: 1 first floor indoor air sample, 1 basement indoor air sample, 1 sub-slab soil vapor sample, and 1 outdoor air sample	12 (3 sub-slab soil vapor, 6 indoor air; 2 outdoor air, 1 duplicate)	VOCs by EPA Method TO-15 QA/QC: 1 duplicate soil vapor sample per 20 samples

Acronym List:
MS/MSD: Matrix Spike/Matrix Spike Duplicate
TCL: Target Compound List
TCLP: Toxic Characterisitc Leaching Procedure
VOCs: Volatile Organic Compounds
SVOCs: Semi-Volatile Organic Compounds
SVI: Soil Vapor Intrusion
QA: Quality Assurance
QC: Quality Control
PCBs: Polychlorinated Biphenyls
EPA: Environmental Protection Agency
LNAPL: Liquid Non-Aqueous Phase Liquid
RCRA: Resource Conservation and Recovery Act

*: Contigent on LNAPL presence

Table 3
Analytical Methods/Quality Assurance Summary
Site Characterization

Former New York Cleaning and Dyeing Off-Site
NYSDEC Site # C224264A
376-378 Flushing Avenue
Brooklyn, NY

					Containers per Sample			Preservation Requirements			
Parameter	**Matrix**	**Number of Samples (including Field QC)**	**Preparation Method**	**Analytical Method**	**No.**	**Size**	**Type**	**Temp.**	**Light Sensitive**	**Chemical**	**Maximum Holding Time**
GROUNDWATER											
TCL VOCs +10 via Method 8260	Aqueous	9	5035	SW-846 Method 8260D	3	40 ml	glass	2-6º C	No	Hydrochloric Acid	14 days
TCL SVOCs + 20 via Method 8270	Aqueous	9	3546	SW-846 Method 8270E	2	Liter	amber bottle	2-6º C	Yes	NA	7 days
PCBs via Method 8082	Aqueous	1	6003A	SW-846 Method 8082A	1	Liter	amber bottle	2-6º C	Yes	NA	7 days
RCRA 8 Metals via 6010D & 7470	Aqueous	1	1311/4216B/4223/4206	SW-846 Method 6010D/6020B/7471B	1	250 ml	plastic	2-6º C	No	HNO3	14 days
SOIL											
TCL VOCs +10 via Method 8260	Soil	up to 13	5035A	SW-846 Method 8260D	1	any size jar	clear/amber glass	2-6º C	No	Freezing	14 days
TCL SVOCs + 20 via Method 8270	Soil	up to 13	3546	SW-846 Method 8270E	1	4 oz	amber glass	2-6º C	Yes	NA	14 days
Ignitability	Soil	1	-	SW-846 Method 1030	1	8 oz	amber glass	2-6º C	No	NA	28 days
Corrosivity (pH)	Soil	1	-	SW-846 Method 9045C				2-6º C	No	NA	Immediate
Reactivity (Cyanide)	Soil	1	-	SW-846 Method 9014				2-6º C	No	NA	14 days
Reactivity (Sulfide)	Soil	1	-	SW-846 Method 9030A				2-6º C	No	NA	7 days
TCLP VOCs via Method 8260	Soil	1	1311/5004A	SW-846 Method 8260B				2-6º C	No	NA	14 days
TCLP SVOCs via Method 8270	Soil	1	1311/5003B	SW-846 Method 8270C				2-6º C	Yes	NA	14 days
TCLP RCRA 8 Metals via Method 6010D & 7470	Soil	1	1311/4216B/4223/4206	SW-846 Method 6010D/6020B/7471B				2-6º C	No	NA	6 months
TCLP Pesticides via Method 8081	Soil	1	1311/6001A	SW-846 Method 8081B				2-6º C	No	NA	14 days
TCLP Herbicides via Method 8151	Soil	1	1311/6004	SW-846 Method 8151A				2-6º C	No	NA	14 days
PCBs via Method 8082	Soil	1	6003A	SW-846 Method 8082A				2-6º C	Yes	NA	14 days
LNAPL											
TCL VOCs +10 via Method 8260	Aqueous	1*	5035	SW-846 Method 8260D	3	40 ml	glass	2-6º C	No	Hydrochloric Acid	14 days
TCL SVOCs + 20 via Method 8270	Aqueous	1*	3546	SW-846 Method 8270E	2	Liter	amber bottle	2-6º C	Yes	NA	7 days
PCBs via Method 8082	Aqueous	1*	6003A	SW-846 Method 8082A	1	Liter	amber bottle	2-6º C	Yes	NA	7 days
Total Petroleum Hydrocarbons via Method 8015	Free Product/Liquid	3*	NA	SW-846 Method 8015B	3	40 ml	glass	2-6º C	No	Hydrochloric Acid	14 days
SOIL VAPOR/AMBIENT AIR											
VOCs	Soil Vapor, Air	12	NA	EPA TO-15	1	6-Liter	summa canister, 24-hour regulator	NA	No	NA	30 days (summa canister)

*= Contigent Sample Quantities based on presence of LNAPL
MS/MSD: Matrix Spike/Matrix Spike Duplicate
TCL: Target Compound List
TCLP: Toxic Characterisitc Leaching Procedure
VOCs: Volatile Organic Compounds
SVOCs: Semi-Volatile Organic Compounds
QA: Quality Assurance
QC: Quality Control
PCBs: Polychlorinated Biphenyls
EPA: Environmental Protection Agency
LNAPL: Light Non-Aqueous Phase Liquid
RCRA: Resource Conservation and Recovery Act
oz = ounce
ml= milliliter
C= Celsius
HNO3 = Nitric Acid

APPENDIX A
Site-Specific Health and Safety Plan

MOVE YOUR ENVIRONMENT FORWARD

SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP)

Former New York Cleaning and Dyeing Off-Site - Site #C22426A
376-378 Flushing Ave
Brooklyn, New York 11234

Prepared For:

Contract# D009808, Work Assignment No. 38
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7012

Prepared By:

HRP Associates, Inc.
1 Fairchild Square, Suite 110
Clifton Park, NY 12065

HRP #: DEC1038.P2

Issued On: February 16, 2024

Addendum Number	Date Issued	Reason For Modification

Disclaimer

HRP Associates does not guarantee the health or safety of any person entering this site. Due to the potential hazards of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards which may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this plan were prepared specifically for this site for use and should not be used on any other site.

CERTIFICATION

This Addendum to HRP's Generic Health and Safety Plan has been prepared under the supervision of, and has been reviewed by, an Associate Safety Professional (ASP) certified by the Board of Certified Safety Professionals.

Bryan Sherman, ASP
ASP # 31838

TABLE OF CONTENTS

CERTIFICATION II

1.0 EMERGENCY CONTACTS/PLANNING 1

2.0 INTRODUCTION 2

2.1 Purpose and Scope 2
2.2 Site Information and Areas of Environmental Concern 2
2.3 Background and Project Description 2

3.0 AREAS OF ENVIRONMENTAL CONCERN 5

3.1 Scope of Work 5

4.0 HAZARD ANALYSIS 6

4.1 Hazard Analysis Summary/Minimization 7
4.2 Changes in Conditions or Scope 7
4.3 Monitoring Procedures 7

5.0 ENGINEERING CONTROL MEASURES/GENERAL SAFETY 9

5.1 Air Monitoring 9
5.2 Protective Zones 9

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) 10

6.1 Level of Protection 10

7.0 DECONTAMINATION 12

7.1 Decontamination Procedures 12
7.2 Emergency Decontamination 12
7.3 Personal Hygiene 12

8.0 EMERGENCY ACTION PLAN/SPILL RESPONSE 13

9.0 TRAINING/MEDICAL SURVEILLANCE 14

9.1 Training Requirements 14
9.2 Pre-Entry Briefing 14
9.3 Morning Safety (Tailgate) Meeting 14
9.4 Medical Surveillance 15

10.0 AUTHORIZATIONS 16

11.0 FIELD TEAM REVIEW 17

12.0 APPROVALS 18

Figures

Figure 1 Site Location Map
Figure 2 Site Plan with Areas of Environmental Concern
Figure 3 Route and Map to Nearest Hospital and Medical Center

Tables

Table 1a Chemical Hazards Known or Suspected On-Site
Table 1b Physical Hazards Known or Suspected On-Site
Table 2 HASP Acceptance and Site Visitor Log

Appendices

Appendix A Safety and Logistics Planning Call Log
Appendix B Personnel Log
Appendix C Supervisor's Investigation Report
Appendix D Daily Job Brief Record
Appendix E Equipment Calibration Log
Appendix F COVID-19 Health and Safety Guidelines
Appendix G Safety Data Sheets (for chemicals brought to the site)

1.0 EMERGENCY CONTACTS/PLANNING

The Health and Safety Officer will coordinate the entry and exit of response personnel in the event of an emergency. The following information, including directions to the nearest hospital shall be posted at the Site. When contacting the local authorities, be sure to provide: your name, facility name, full address, telephone number, and the nature of the emergency.

Emergency Phone Numbers 376-378 Flushing Avenue Brooklyn, NY	
Emergency Contact	**Phone Number**
Fire, Ambulance, Police Emergency:	911
NYCPD 79th Precinct (Sector D) Police Department (routine calls):	718-636-6611
FDNY Engine 230- Fire Department (routine calls):	718-965-820
Woodhull Hospital	718-963-8000
Poison Control Center:	1-800-222-1222
DEC spills hotline:	1-800-457-7362
National Response Center:	800-424-8802
Project Manager: Patrick Montuori	518-526-2322
Site Safety Officer: Reed Lewandowski	518-269-2977
NYSDEC Project Manager: Wendi Zeng	(718) 482-7541

Map and directions to the following medical facilities are provided in **Figure 3**:

- **Woodhull Hospital**
  (approximately 1.1 miles from the work site)

First Aid, Fire Protection, Emergency Response Equipment Storage Locations	
First Aid Kit:	In Vehicle
Fire Extinguisher:	In Vehicle
Eye Wash (Bottle):	In Vehicle

A Safety and Logistics Planning call will be held prior to conducting any intrusive activities at the site. Representatives from HRP and each subcontractor will attend the call to discuss logistical and safety challenges general to the scope of work and specific to the Site. This call is documented on the Safety and Logistics Planning Call Log in **Appendix A.**

2.0 INTRODUCTION

2.1 Purpose and Scope

This Health and Safety Plan (HASP) addresses the health and safety practices that will be employed by HRP Associates, Inc. personnel and our subcontractors participating in the Site Characterization (SC) that will be performed at the site. The SC will be comprised of several tasks to evaluate the environmental condition of the Site and the surrounding area, including media sampling, installation of wells and surveying to collect soil, air, and water samples.

This HASP has been developed in accordance with HRP's Generic Safety and Health Program as required under OSHA's Hazardous Waste Operations Standard (29 CFR 1910.120). This Plan has been developed to establish minimum standards necessary for onsite investigation activities to protect the health and safety of HRP personnel. HRP site personnel have received the required level of training and field experience as required under subpart (e) of the Standard and have received medical examinations in accordance with HRP's medical surveillance program as required under subpart (f) of the Standard. No other personnel will be permitted in the Exclusion Zone unless they have received training and medical surveillance under the Standard.

HRP personnel and associated contractors shall be familiar with this HASP prior to conducting proposed site work. This plan must be present on site and be available for reference/inspection when the subject site work is being conducted.

2.2 Site Information and Areas of Environmental Concern

2.2.1 Site Information and Description

Site Name: 376-378 Flushing Avenue

Site Address: 376-378 Flushing Avenue, Brooklyn, NY

Site Contact: Patrick Montouri

Phone Number: 518-526-2322

2.3 Background and Project Description

The Site is located on 376-378 Flushing Avenue in the Bedford-Stuyvesant section of Brooklyn, New York. The 0.882-acre Site currently consists of a recently redeveloped eight-story mixed-use commercial and residential building on Block 1884, Lots 40 and 48. The offsite investigation consists of Block 1884, Lots 33 and 53, and the offsite area surrounding the Site. In 2019, the Site was redeveloped into an eight-story mixed use building.

The Site was developed around 1887 with multiple retail store fronts and residential dwellings. The Site appears to have been redeveloped by 1935 with a one-story building on lot 40 which was utilized as a parking garage, and two one-story buildings, utilized as auto repair and a paper

company, on the western portion of Lot 48. In the 1940's, the eastern portion of Lot 48 was redeveloped with a large one-story commercial building, and a dry cleaner, and in 1965, a second story was added to the middle building of Lot 48. Dry cleaning operations were purportedly in operation in 1947 through 2017. The building layouts on Lots 40 and 48 remained until being razed for redevelopment in 2019. Prior to redevelopment, the Site was occupied by Exclusive Doors and Moldings, Rose Castle Catering Hall, and a Community Service Center. In 2019, the Site was redeveloped into an eight-story mixed use building with retail spaces on the 1st floor, residential dwellings on floors 2 through 8, including a cellar with ventilated parking, and mechanical rooms.

Previous investigations identified the presence of petroleum related VOCs and individual SVOCs present in soil and groundwater for each medium. Petroleum related VOCs and chlorinated VOCs (CVOCs) were detected in the soil vapor samples at the Site. Petroleum related VOCs and CVOCs were detected in the soil vapor samples at the Site.

The purpose of the SC is to determine whether a Site poses little or no threat to public health and the environment or if it poses a threat and whether the threat requires further investigation. In accordance with DER-10 *Technical Guidance for Site Investigation and Remediation (May 2010),* the primary objectives of the SC scope of work are to:

- Investigate the identified areas of concern (AOCs) associated with the Site, determine if they have resulted in surface or subsurface contamination and evaluate the extent of the contamination.

- Obtain geologic and hydrogeologic data from the Site. The specific information that should be collected and/or verified includes soil types (or fill), depth to groundwater, groundwater flow direction, subsurface geology, bedrock characteristics, etc.

- Determine if applicable standards, criteria, and guidance contained in NYSDEC DER-10 and set forth for the Site are contravened.

- Preliminarily delineate the vertical and horizontal extent of contaminated groundwater, if any.

- Establish a baseline for any remedial work that will be necessary to address impacted media.

- Determine if the Site represents a threat to public health or the environment.

2.3.1 Personnel Designations

The following personnel are designated to perform the stated project activities and to ensure that the requirements of this HASP are met. The same person may fill more than one role, and/or serve as an alternate in the absence of the designated team member. All subcontractors must have received the required level of training and field experience as required under subpart (e) of

OSHA 29 CFR 1910.120 and OSHA 29 CFR 1926.65 for Hazardous Waste Operations and Emergency Response (HAZWOPER).

Project Team Member	Responsibilities and Tasks
Reed Lewandowski (or Qualified Alternate Safety Officer)	HSO – HRP Associates, Inc. - Ensuring all site work is being performed in accordance with HRP Associates, Inc. Safety Program, as well as in accordance with local, state and federal regulations. - Directing and implementing HRP's HASP. - Reviewing the Subcontractor's HASP and being aware of the hazards detailed therein. - Conduct a job orientation meeting and routine safety meetings for HRP Associates, Inc. employees and subcontractors, as applicable. - Provide copies of these inspections, recordkeeping/personnel logs to the engineer/contractor as required. - Ensuring all project personnel have been adequately trained in the recognition and avoidance of unsafe conditions. - Authorizing Stop Work Orders that shall be executed upon the determination of an imminent health and safety concern, and will notify the appropriate contacts upon issuance of this order. - Authorizing work to resume, upon approval from the Contractor. - Directing activities, as defined in the HRP's and the Contractor's written HASP, during emergency situations. - Providing personnel monitoring where applicable. - Ensuring that adequate personal protective equipment and first aid supplies are available. - Ensure site security, to the extent practicable. - Ensure accident victims are promptly cared for, and the incident is investigated and properly reported.
Patrick Montuori (Site Supervisor/ Project Manager) **(Alternate Site Supervisor) Mark Wright**	Site Supervisor/Project Manager – HRP Associates, Inc. - Monitor and assist the site Health and Safety officer. - Maintain appropriate rules, regulations and codes at the job site. - Provide advance safety planning for all activities through the use of scheduling and administrative controls. - Obtain site-specific health and safety information and communicate that information with the appropriate personnel (i.e. contractors, client, etc.) - Report all injuries, illnesses and other incidents to the Director of Safety. - Ensure all HRP personnel are trained and qualified to perform site work.
Site Workers (Subcontractors)	**Site Workers** - Read and work in accordance with this HASP. - Report all unsafe work practices to the HSO. - Report all incidents, including near-misses to the HSO. - Work in a safe manner. - Provide Designated Competent Person
A complete list of HRP employee and subcontractor responsibilities (as applicable) can be found in the HRP Generic Health and Safety Plan. 1 A list of site workers will be maintained in the Personnel Log (**Appendix B**) 2 Supervisors Investigation Report included as (**Appendix C**)	

3.0 AREAS OF ENVIRONMENTAL CONCERN

3.1 Scope of Work

The SC will consist of the installation and sampling of three off-site groundwater monitoring wells, and the completion of SVI investigations at two off-site structures. The field investigation tasks for the Site are listed below in the order that they are expected to be completed:

1. Obtain Access Agreements with Off-Site Property Owners and Acquire Permits
2. Underground Utility Identification and Clearance using Ground-Penetrating Radar (GPR)
3. SVI Investigation (installation of sub-slab soil vapor points and SVI investigations)
4. Groundwater Characterization (monitoring well installation and sampling)
5. Characterization and Disposal of Investigation Derived Waste
6. Analytical Data Quality Evaluation
7. Base Map Development and Site Survey

The Scope of Work is outlined in detail in Section 2.0 of the Work Plan.

4.0 HAZARD ANALYSIS

The project hazard analysis below identifies the hazards that are anticipated to be encountered by the project team.

Physical Hazards Present	☒ Electricity ☒ Trips/Falls/Floor openings ☐ Holes/Pits ☒ Inclement weather ☒ Heat ☒ Cold ☐ Vibration ☒ Flying particles	☐ Ionizing radiation ☐ Non-Ionizing radiation ☐ Lasers ☒ Overhead hazards ☒ Noise ☐ Visible dust ☐ Falling objects ☐ Other _____
Health/Chemical Hazards Present [1]	☒ Dust/Fumes/Particulates ☐ Flammable/Combustible ☐ Compressed gas ☐ Explosive ☐ Water reactive ☐ Unstable ☒ Contact with contaminated media	☐ Oxidizer ☐ Corrosive ☐ Toxic ☐ Highly Toxic ☐ Irritant ☐ Sensitizer ☒ Carcinogen/Mutagen ☐ Other _____
Environmental/Equipment Hazards Present	☒ Heavy machinery ☒ Drilling ☒ Water operations ☒ Mobile equipment ☒ Road work ☐ Railroad work ☐ Forklifts ☒ Power tools ☐ Welding ☐ Gas cylinders ☒ Overhead/underground utilities	☐ Trenching/excavation ☐ Elevated heights/man lifts ☐ Scaffolding ☐ Ladders ☐ Confined spaces ☐ Energized equipment ☒ Overhead hazards ☒ Drums/container handling ☒ Insects/rodents/snakes ☐ Biological hazards ☐ Other _____
Personal Safety Considerations	☒ Security Issues ☐ Remote setting ☐ Employees working alone ☒ Limited lighting	☐ Off hour shifts ☐ Dangerous wildlife/animals ☒ Limited cell phone service ☐ Other _____
[1] **Table 1a** (following the text of this HASP) provides a list of chemical substances for reference, along with odor threshold, permissible exposure limit (PEL), threshold limit value (TLV), OSHA ceiling, IDLH concentration, route of exposure and symptoms of acute exposure, if any.		

Details of specific hazards associated with individual tasks will be discussed in the Daily Job Brief Record (**Appendix D**).

4.1 Hazard Analysis Summary/Minimization

HRP's Corporate Health & Safety Plan (in conjunction with this HASP) will be cross-referenced in order to obtain the safe work practice procedures for mitigating and preventing project site hazards identified in the table above. Job site hazard prevention and minimization information can be found in Section 3 of HRP's Generic Health & Safety Plan.

Confined Spaces

Only properly trained HRP personnel are authorized to enter confined spaces. Confined space entry may be performed by subcontractors who have the proper training and experience to conduct this work. Confined space entry is not anticipated during the SC.

Excavations

It is HRP's policy to ensure that for excavation projects the subcontracted environmental contractor will provide a competent person to perform daily and as needed inspections of excavation sites. This policy will be conveyed through the subcontract agreement with the environmental contractor. At a minimum HRP will provide our employees involved with construction projects with awareness level training regarding excavation hazards and notify the subcontracted firm if any obvious excavation safety hazard exists during on-site activities.

Chemical Hazards

Hazardous chemicals known or suspected to be onsite are listed in **Table 1a** (follows text). **Table 1a** includes Chemical name, odor threshold OSHA PEL, ACGIH TLV, OSHA STEL, IDLH Concentrations, routes of exposure and symptoms of acute exposure. Chemicals likely to be encountered during site work are highlighted.

4.2 Changes in Conditions or Scope

Should conditions or the scope of work described herein change significantly; a HASP Addendum will be completed.

4.3 Monitoring Procedures

Air monitoring will be used to determine the concentrations of various chemicals while working in the exclusion zone to evaluate worker exposure to contaminated media. In order to determine potential health hazards and to determine the level of personal protection needed during sampling activities within the areas of concern, a Photoionization Detector (PID) will be periodically operated to monitor air quality for the purpose of ensuring minimal exposure to volatile organic compounds. Monitoring of atmospheres adjacent to on-going excavations and around the treatment area shall also be conducted with a PID.

The following environmental monitoring instruments/procedures shall be used on-site at the specified intervals.

Instrument/Procedure	**Sampling Interval**
Photoionization Detector (PID) in the breathing zone	Periodically as deemed by HSO

Background ambient air levels will be established outside the exclusion zone prior to commencement of site work. Ambient air sampling will occur in the breathing zone of site workers for comparison to the action levels (described below). Additionally, air sampling will be conducted in the vicinity of any intrusive exploration (i.e., near excavations, trenches, etc.) to determine if any contaminants are present.

The following *Action Levels* will be used:

Instrument	**Action Level**	**Level of Protection or Action Required**
PID	No reading above background	▪ No action required. ▪ Continue PID monitoring. ▪ (Modified) Level D protection.
PID	Up to 5 ppm above background	▪ Evacuate exclusion zone. ▪ Recheck levels after 15 minutes. ▪ If levels are sustained, reassess. ▪ Use engineering controls to lower breathing zone vapors. ▪ Level C protection (at the HSO direction).
PID	>5 ppm above background	▪ Evacuate exclusion zone. ▪ Recheck levels after 15 minutes. ▪ Use engineering controls to lower breathing zone vapors. ▪ If levels are sustained, contact Safety Manager, and re-evaluate HASP.

When an action level is equaled or exceeded, the work area should be evacuated, and the area re-tested with the sampling device. If the appropriate action level continues to be exceeded, the HSO will have to assess the use of engineering controls to lower vapor levels or availability of required increased personal protection equipment before authorizing re-entry.

Calibration of all instruments will occur at least once per day, when in use. An equipment calibration log is included in **Appendix E.**

Community Air Monitoring

To ensure the protection of receptors surrounding the site HRP has developed and will implement a Community Air Monitoring Program (CAMP), which requires real time monitoring of volatile organics and dust during the remedial investigation. The CAMP, included as Appendix B to the SC Work Plan will be implemented during all intrusive activities.

5.0 ENGINEERING CONTROL MEASURES/GENERAL SAFETY

5.1 Air Monitoring

In order to determine potential health hazards and to determine the level of personal protection needed during drilling, excavation and sampling activities within the areas of concern, a PID will be periodically operated to monitor air quality for the purpose of ensuring minimal exposure to volatile organic compounds. Please refer to Section 4.3 of this plan for specific air monitoring procedures/action levels.

5.2 Protective Zones

Prior to commencement of work in area of suspected contamination, protective zones specific for each phase of the Plan will be established by the HSO if necessary, prior to the start of field work. The purpose of the protective zones is to prevent potential cross-contamination of adjacent areas as well as to protect project personnel from exposure to contaminated areas.

Protective zones shall be delineated as follows:

- Exclusion Zone: This is the contaminated area in which intrusive activities are performed. The "Area of Environmental Concern" (AOEC) is located within this area. A single access point for entrance and exit should be established and maintained, if possible. This zone should be delineated from the Contaminant Reduction Zone via perimeter cones or caution tape, or other applicable method. The Exclusion Zone delineation and any necessary modifications will be based on site conditions.

- Contaminant Reduction Zone: This zone is a transition zone located between the Exclusion Zone and the Support Zone and is utilized to decontaminate personnel and equipment.

- Support Zone: This zone will be utilized by equipment and vehicle storage and will be kept free of contaminated material. The HSO will determine the location of this zone. In the event of a site evacuation, the rally point will be on the sidewalk at the south corner of Kent Avenue and Little Nassau Street (**Figure 2**). The designated rally point may be relocated by the HSO based on project or site conditions. All site workers will be notified of any relocation prior to implementation.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

6.1 Level of Protection

As identified in Section 4.0, the overall health and safety risk associated with chemical hazards for HRP and associated contractors is considered significant. This is primarily due to the moderate concentrations of chemical contaminants expected based on minimal contact personnel will have with any potentially contaminated media. Therefore, the minimal level of protection for HRP personnel during the conduct of all the environmental work performed at the site will be Level D PPE, and will generally consist of the PPE listed below:

- Steel toe/shank work boots
- Hard hat, as necessary
- Safety vest, as necessary
- Coveralls/tyvek, as necessary
- Safety glasses/goggles/face shield, as necessary
- Hearing protection, as necessary

If site conditions warrant, an upgrade to Level C PPE may be required (refer to Section 4.3 for the appropriate *Action Levels*) then the contractors will make Level C personal protective equipment (PPE) readily available. Level C PPE generally includes:

- Full face, air purifying respirator with organic vapor cartridges
- Same as Level D, but also includes Tyvek taped pant/boot and glove/shirt

If it is determined protection beyond Level C is required, HRP will re-evaluate the HASP as well as the site conditions, and will revise the HASP as required. The following table provides a summary of the minimum level of PPE required on site:

Description	Level of Protection [1]	
	D	C
Body		
Work Clothes	R	R
Chemical Protective Suit (Tyvek)	O	R
Visibility Vest	R [2]	R [2]
Apron	O	O
Fall Protection	O [2]	O [2]
Head		
Hard Hat	R	R
Head Warmer	O	O
Eyes & Face		
Safety Glasses	R	R
Goggles (based on hazard)	O	R
Face Shield	O	O
Ears		
Plugs or Muffs	R [2]	R [2]
Hands & Arms		
Work Gloves	R	O [2]

Description	Level of Protection [1]	
	D	C
Chemical Resistant Gloves (Nitrile)	O	R
Insulated Gloves	O	O
Foot		
Work Boots/Steel Toe Boots	R	R
Chemical Resistant Boots	O	O
Disposable Boot Covers	O	O
Respiratory Protection [3]		
½ Mask Air Purifying Respirator (APR) or Full face APR	NA	R
Dust Protection	O	NA
Powered APR	NA	NA
SCBA/Supplied Air Respirator	NA	NA

R = Required, **O** = Optional, **NA** = Not Applicable

[1] The level of protection identified here does not include the necessary equipment for entering confined spaces. Refer to Moran Environmental Recovery's Safety Manual Confined Space Program for atmospheric sampling protocols and breathing and rescue equipment necessary for those operations.

[2] The use of this PPE may or may not be required depending on site conditions/location and will be addressed at the time of task assignment by the HSO.

[3] Respiratory protection necessary to protect against VOC, dusts/particulates and not oxygen deficient atmospheres.

The following table provides a general description of potential field activity tasks to be performed and associated (recommended) PPE. The use of this PPE may or may not vary depending on site conditions and will be addressed at the time of task assignment by the HSO.

Task Description	Invasive (Y/N)	Protection Level
Site Mobilization - Surveying, fence and barrier installation, hay bale installation, decon and work zone set up, soil staging areas preparation	N	Level D
Soil and Water Sampling - Drilling, sampling, soil moving as needed.	Y	Modified Level D or Level C – Respirator as needed based on monitoring. Eye protection required during collection of any liquid sample
Soil Excavation, Staging and Load-Out	Y	Modified Level D – or Upgrade to Level C dependent on monitoring
Decontamination - Truck dry sweeping, decon pressure wash of equipment, PPE change out	Y	Modified Level D – or Upgrade to Level C dependent on monitoring
Waste Management - Soil load-out for off-site disposal, water removal for disposal, PPE disposal	Y	Modified Level D – or Upgrade to Level C dependent on monitoring
Site Control (Exclusion, Decontamination, Support Zones)	N	Modified Level D – or Upgrade to Level C dependent on monitoring
Communications - Use of hand signals, backup alarms, and voice	N	NA
Site Restoration	Y	Level D

7.0 DECONTAMINATION

7.1 Decontamination Procedures

All personnel and equipment leaving the exclusion zone must be properly cleaned and decontaminated. When there is evidence of chemical contamination during the site operations, all personnel will be decontaminated under the direction of the HSO. Clean-up and/or decontamination of personnel shall consist of washing off excessively soiled PPE with a disinfectant detergent scrub and water. At the very least, all personnel should wash their hands and face before leaving the exclusion zone. After washing, all disposable clothing (tyvek, gloves, etc.) will be removed and placed in a double lined plastic bag.

Sampling tools and any other non-disposable items will be decontaminated between sampling points, and at the direction of HRP personnel, to prevent cross-contamination of work areas or environmental samples, as applicable.

7.2 Emergency Decontamination

If immediate medical attention is required in an emergency, decontamination will be performed after the victim has been stabilized. If a worker has been exposed to an extremely toxic or corrosive material, then emergency decontamination will consist of flushing with copious amounts of water. If the victim cannot be decontaminated because it will interfere with emergency medical aid being administered, then the victim should be wrapped with plastic or other available items (i.e. an uncontaminated coverall) to reduce potential contamination of other personnel or medical equipment.

If a site worker has been overcome by heat related illness, then any protective clothing should be removed immediately. In the case of non-medical emergency evacuation, decontamination should be performed as quickly as possible, unless instant evacuation is necessary to save life or prevent injury.

7.3 Personal Hygiene

All employees will be required to wash hands and face prior to eating, smoking, drinking and going to the bathroom. Workers will be required to remove contaminated PPE and clothing prior to leaving the Contaminant Reduction Zone. All field personnel should avoid contact with potentially contaminated substances such as puddles, pools, mud, etc.

Additional personal hygiene requirements, intended to prevent the spread of the novel corona virus to site workers will be in effect during site activities. These procedures include mobile handwashing stations and the requirement for site workers to wear face coverings. Additional details are included in **Appendix F**.

8.0 EMERGENCY ACTION PLAN/SPILL RESPONSE

In the event of a worker injury, fire, explosion, spill, flood, or other emergency that threatens the safety and health of site workers, the following procedure will be followed:

1. If the emergency originates within the work area covered by this Plan, the HRP HSO shall act as the Emergency Coordinator. The emergency evacuation signal is an air horn or a loud yell. All emergency situations (including worker injuries, no matter how small) will be reported to the HSO, who will determine the appropriate emergency response, up to and including evacuation. Only the HSO may initiate evacuation of the work area. The HSO will be responsible for reporting any emergency situation to the appropriate authorities, using a telephone or other appropriate method.

2. In the case of an evacuation, site workers will exit the site along the safest route(s) and assemble with team members at a safe rally point. Those workers in the Exclusion Zone will follow the emergency decontamination procedures outlined in Section 7.2. Accounting of all site personnel will be conducted by the HSO using the personnel log at a location determined by the HSO.

3. HRP personnel are not permitted to participate in handling the emergency. Fire and medical emergencies will be handled by the local fire department and ambulance service. In the case of a spill of hazardous materials the NYSDEC will be contacted.

   In addition, the HSO/Project Manager must advise the site contact that the New York Spill Hotline should be contacted and, if the spill quantity is greater than the Reportable Quantity (RQ) under CERCLA and/or SARA, the National Response Center (NRC) and Local Emergency Planning Committee should also be contacted. If the spill begins to flow overland and threatens to contaminate a storm drain or surface water, HRP personnel may attempt to contain and isolate the spill using any available resources, but only if, in the judgment of the HSO, such action will not expose the workers to dangerous levels of hazardous substances and is necessary to preserve life or property. In the event that a spill of material of any amount threatens to reach navigable waters, the NRC shall be contacted.

4. Once initial emergency procedures to protect worker safety and health have been addressed, and control of emergency has been completed, the HSO will complete an Investigation Report and submit this form to the appropriate personnel (HRP and/or client contact).

5. All site workers will be familiarized with the above procedures during the pre-entry briefing to be conducted before site work begins.

9.0 TRAINING/MEDICAL SURVEILLANCE

9.1 Training Requirements

All HRP and HRP subcontractor personnel who enter the work zone and/or Exclusion Zone must have successfully completed the 40-hour or 24-hour training requirement outlined in 29 CFR 1910(e). If the 40-hour or 24-hour training of any person occurred more than 12 months prior to commencement of work, then that person must have attended an 8-hour refresher course within the 12 months prior to commencement of work. If respirators are in use in the Exclusion Zone, then all personnel must have undergone respirator training and a fit test within the last 12 months. Training certificates and records for HRP employee(s) are on file at HRP. All other contractors will be required to supply written proof of training before being allowed into the Exclusion Zone.

9.2 Pre-Entry Briefing

Prior to commencement of work in an area of suspected contamination, HRP's Health and Safety Officer will conduct a pre-entry briefing with on-site contractors, which will include the following:

- Name of the HSO and person responsible for the visitor log.
- Description of the parcel as well as location of emergency telephones and the location/boundaries of the Exclusion Zone, Contamination Reduction Zone, and Support Zone, if established.
- Review of hospital locations and directions.
- Review of tasks to be conducted within the parcel by the site workers.
- Review of the Emergency Action Plan and rally point, including the nearest emergency communications and telephone numbers.
- The nature, level, and degree of anticipated hazards (physical and chemical) involved in the site work.
- Required personal protective equipment.
- Decontamination procedures.

The HSO should also, at this time, ensure that all on-site HRP and HRP subcontractor personnel have read the HASP and signed the last page of the original (Section 11.0). If additional information on the site becomes available, the HSO will call additional briefings as necessary.

9.3 Morning Safety (Tailgate) Meeting

The HRP HSO will conduct a safety overview meeting at the beginning of each workday on the site. The meeting will be given in addition to any tailgate meetings that the subcontractor conducts. A summary of the meeting topics signed by the personnel attending the meeting is included in **Appendix D**.

9.4 Medical Surveillance

All HRP and HRP subcontractor personnel entering the Exclusion Zone must have had a physical within the 12 months prior to commencement of site work. A physician's written opinion regarding fitness for work for each employee including work limitations, if any, is on file at HRP, as applicable. A written opinion for all other site personnel must be supplied prior to commencement of site work to the HRP HSO. Any work limitations for site personnel, or relevant medical information (i.e. allergic reactions to medication) should be included in this Plan.

10.0 AUTHORIZATIONS

Personnel authorized to enter the Exclusion Zone include the personnel listed in Section 2.4. Persons not listed in Section 2.4 may enter the Exclusion Zone only if the appropriate training and medical fitness certifications have been supplied to either the HRP Project Manager or Health and Safety Manager and the HSO or his/her designee on site has approved site entry. All personnel entering or leaving the Exclusion Zone must sign in and sign out with the recordkeeper.

11.0 FIELD TEAM REVIEW

All HRP personnel shall sign below after reading this HASP and shall agree with the following statement:

*"I have read and understand this site specific Health and Safety Plan.
I will comply with the provisions set forth therein."*

Printed Name	Signature	Date

12.0 APPROVALS

This plan meets the minimum requirements of 29 CFR 1910.120 and 29 CFR 1929.65 and has been written for specified site conditions, dates, and personnel, and must be amended if conditions change. By their signature, the undersigned certify that this HASP is approved and will be utilized during activities at the project.

Reed Lewandowski — 7/14/2023
On-Site Health and Safety Officer



Patrick Montuori, PG — 7/14/2023
Project Manager



Bryan Sherman — 7/13/2023
Office Health and Safety Manager

Subcontractor:

I have been provided a copy of this HASP for review.

Name _____ Date _____

Representing _____

The Designated Competent person representing [subcontractor] at the site will be

_____.

Any alternate Competent Person will be noted in the Daily Job Brief Record (**Appendix D**).

ADDITIONAL APPROVALS (or Re-Approvals)	
Name:	**Date:**

FIGURES

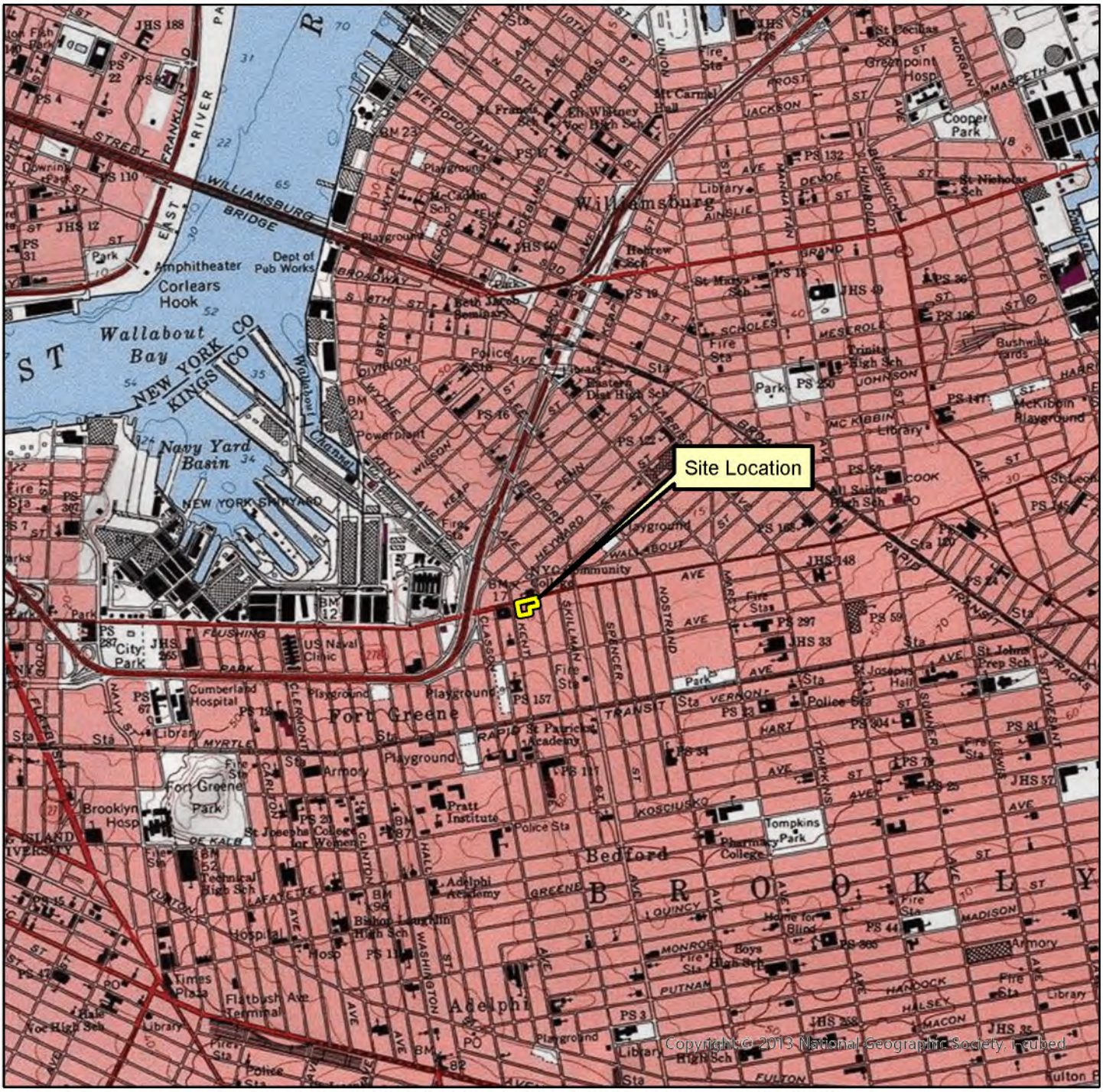


Figure 1
Site Location
Former NY Cleaning and Dyeing Off-Site
(Site #C224264A)
376-378 Flushing Ave
Brooklyn, New York
HRP # DEC1038.P2

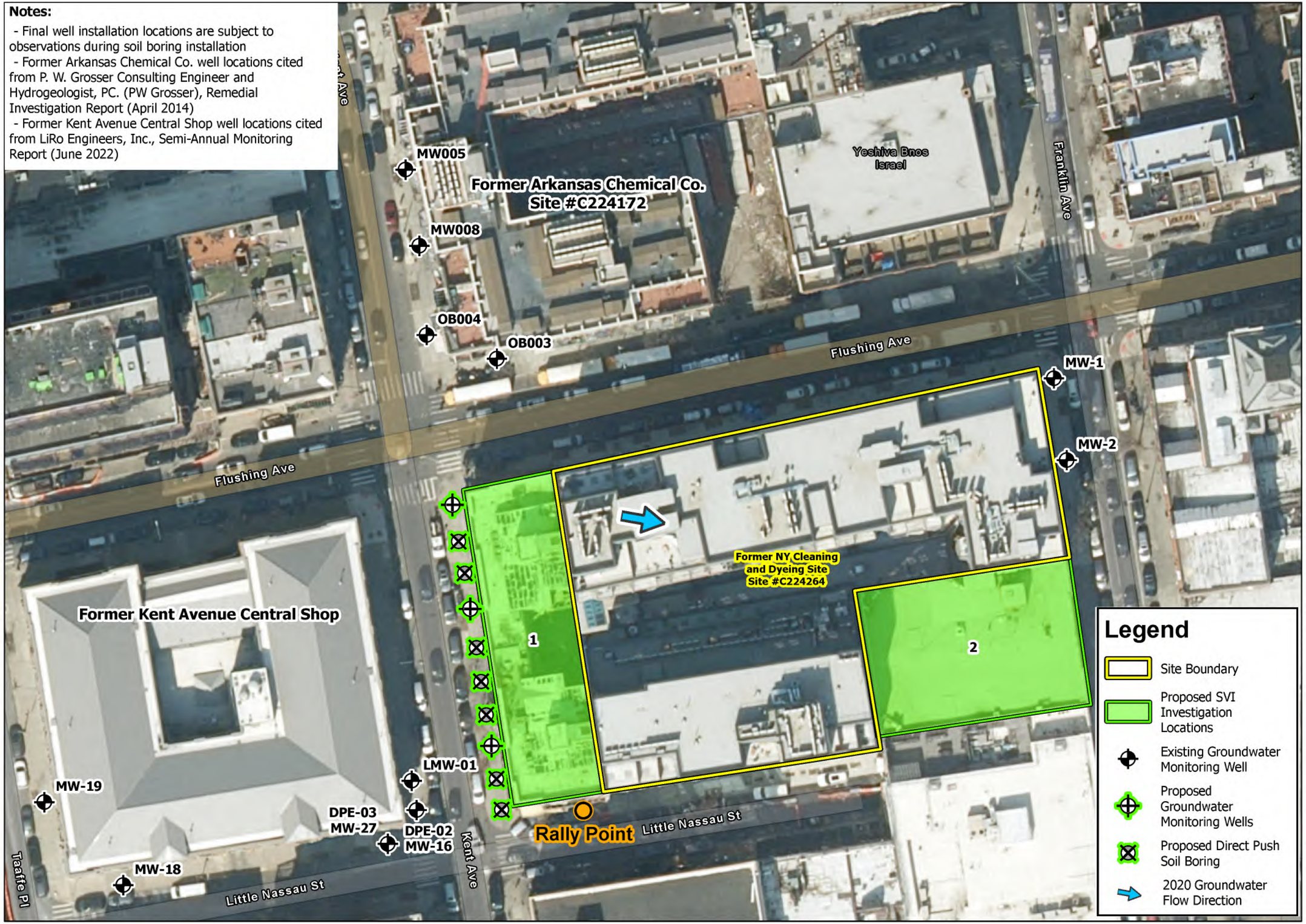
USGS Quadrangle Information
Quad ID: 42078-G3
Name: Brooklyn, New York
Date Rev: 1976
Date Pub: 1995

HRP
MOVE YOUR ENVIRONMENT FORWARD
ONE FAIRCHILD SQUARE
SUITE 110
CLIFTON PARK, NY 12065
(518) 877-7101
HRPASSOCIATES.COM

Path: S:\Data\N\NYDEC - NYSDEC\NEW YORK\VARIOUS NYC\DEC1038P2 - Region 2 NYC Sites\GIS\376-378 flushing ave\Flushing Ave 376 378\Flushing Ave 376 378.aprx

Notes:

- Final well installation locations are subject to observations during soil boring installation
- Former Arkansas Chemical Co. well locations cited from P. W. Grosser Consulting Engineer and Hydrogeologist, PC. (PW Grosser), Remedial Investigation Report (April 2014)
- Former Kent Avenue Central Shop well locations cited from LiRo Engineers, Inc., Semi-Annual Monitoring Report (June 2022)



HRP
MOVE YOUR ENVIRONMENT FORWARD
ONE FAIRCHILD SQUARE
SUITE 110
CLIFTON PARK, NY 12065
(518) 877-7101
HRPASSOCIATES.COM

North

0 25 50 Feet

Revisions					
No.					
Date					

Designed By:	Drawn By:	Reviewed By:
PWM	CMS	PWM

Issue Date:	Project No:	Sheet Size:
1/30/2024	DEC1038.P2	11x17

Site Plan and Proposed Investigation Locations

Former NY Cleaning and Dyeing Off-Site (Site #C224264A)
376-378 Flushing Ave
Brooklyn, New York

Figure No.

2

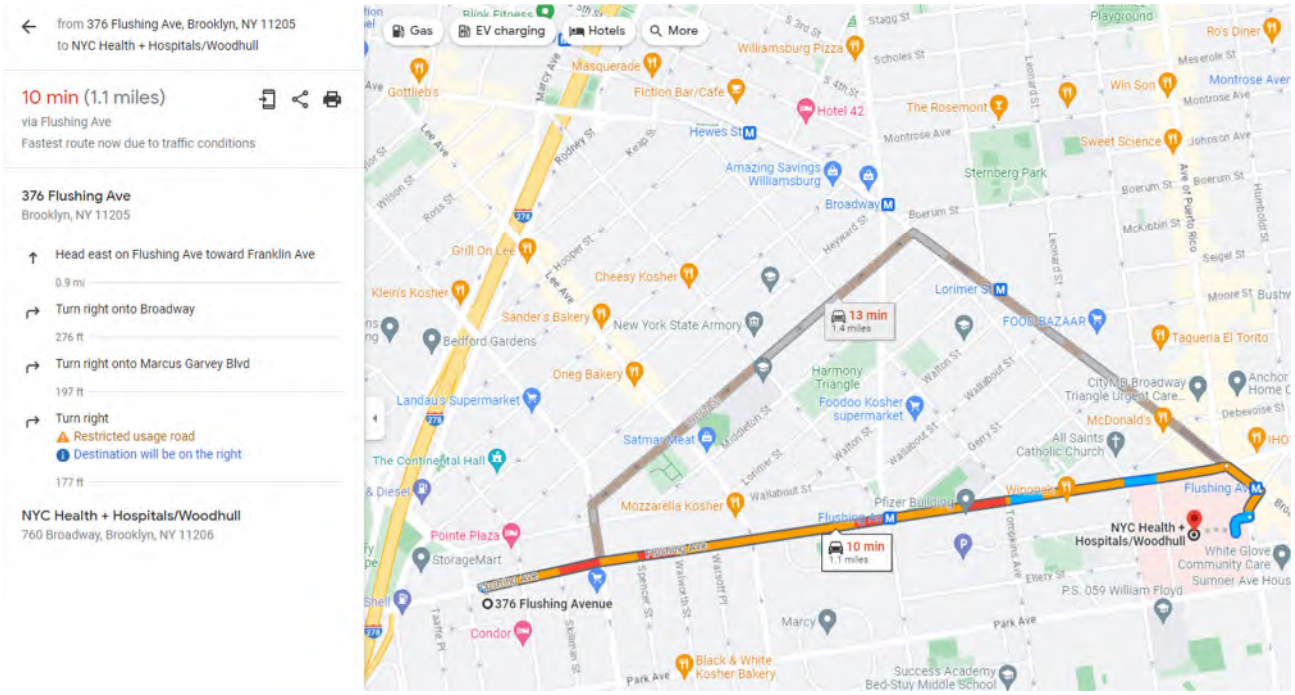
Path: S:\Data\NNYDEC - NYSDEC\NEW YORK\VARIOUS NYC\DEC1038P2 - Region 2 NYC Sites\GIS\376-378 flushing ave\Flushing Ave 376 378\Flushing Ave 376 378.aprx

Figure 3: Route and Map to Nearest Hospital and Medical Center

Directions to Woodhull Medical Center

Total Estimated Time: 8 minutes
Total Estimated Distance: 1.1 miles

Begin at 376-378 Flushing Ave, Brooklyn, NY
End at Woodhull Hospital
760 Broadway, Brooklyn, NY



TABLES

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
1,1,1 Trichloroethane	44 ppm	350 ppm	350 ppm	---	700 ppm	Inh, Ing, Con	Head, Lass, CNS, Derm
1,1,2-Trichloroethane	---	10 ppm	10 ppm	----	[100 ppm]	Inh, Ing, Abs, Con	Eyes, Nose Irrit, Resp Irrit, CNS, Liver, Kidney Damage, Derm, [Carc]
1,2,4 Trimethylbenzene 1,3,5 Trimethylbenzene		25 mg/m^3	25 ppm	25 mg/m^3	ND	Inh, Ing, Con	Irrit Eyes, Skin, Nose, Throat, Resp Sys, Bron, Hyprochronic Anemia, Head, Drow, Ftg, Dizz, Nau, Inco, Vomit, Conf, Chemical Pneu (aspir lig)
1,1' Biphenyl	0.0062 mg/m^3	0.2 ppm	0.2 ppm	---	100 mg/m^3	Inh	
1,1-Dichloroethane	120 ppm	100 ppm	100 ppm	---	3,000 ppm	Inh, Ing, Con	CNS Depres, Skin Irrit, Liver, Lung and Kidney Damage
1,1-Dichloroethylene***	500 ppm	---	5 ppm	---	---	Inh, Con	CNS depress, Resp, [Carc]
1,2-Dichlorobenzene	50 ppm	50 ppm	25 ppm		200 ppm	Inh, Ing, Abs, Con	Irrit, Resp
1,2-Dichloroethylene	26-87 ppm	200 ppm	200 ppm	---	1,000 ppm	Inh, Ing, Con	Vomit, Irrit Eyes, Resp Sys; CNS Depres
1,2-Dichloropropane	130-190 ppm	75 ppm	75 ppm	---	[400 ppm]	Inh, Con, Ing	Eye irritation, Drow, light-headedness; irritated skin, [Carc]
1,3-Dichlorobenzene	---	----	---	----	---	----	----
1,4-Dichlorobenzene	20 ppm	75 ppm	10 ppm	----	[150 ppm]	Inh, Ing	[Carc], Eye Irrit, swelling around eye, headache, nausea, vomiting
1-Methylnaphthalene	0.02 ppm	---	---	---	---	---	---
2,4-Dichlorophenol	1.4007 mg/m^3	---	---	---	---	---	---
2,4-Dimethylphenol	0.001 mg/m^3	---	---	---	---	---	---
2-Methylnaphthalene	0.01 ppm	---	---	---	---	---	---
2-Methylphenol (o-cresol) [skin]	1.4 mg/L	5 ppm	5 ppm	---	250 ppm	Inh, Abs, Ing, Con	Confusion, depression, Resp Fail; difficulty breathing, irregular rapid respiration, weak pulse; skin, eye burns; dermatitis

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
3, 3'-Dichlorobenzidine	---	None	**---**	---	---	Inh, Abs, Ing, Con	Sens, Derm, Head, Dizz, Burns, GI Upset, [Carc]
4-Isopropyltoluene	---	---	---	---	---	Con, Inh, Ing	Defat, Eryt
Acenephthene	0.5048 mg/m^3	---	---	---	---	---	---
Acenaphthylene	---	---	---	---	---	---	---
Acetone	47.5 mg/m^3	1,000 ppm	500 ppm		2,500 ppm	Ing, Inh, Con	Head, Dizz; Irrit Eyes, Nose, Throat; Derm, CNS, Depress, Derm
Acetonitrile	70 mg/m^3	40 ppm	20 ppm	---	500 ppm	Inh, Ing, Abs, Con	Asphy; Nau, Vomit; Chest Pain; Weak, Stupor, Convuls; Eye Irrit
Aldrin	---	0.25 mg/m^3	0.25 mg/m^3	---	25 mg/m^3	Inh, Abs, Ing, Con	Head, Dizz, Nau, Vomit, Mal, Myo, [Carc]
Anthracene (Coal Tar Pitch)	---	0.2 mg/m^3			[80 mg/m^3]	Inh, Con	Derm, bron, [carc]
Antifreeze		50 ppm	100 mg/m^3 (aerosol)	---	ND	Inh, Ing, Con	Irrit Eyes, Skin, Nose, Throat, Nau, Vomit, Abdom Pain, Lass, Dizz, Stup, Conv, CNS, Depres, Skin Sen
Arsenic	----	0.010 mg/m^3	0.01 mg/m^3	----	[5 mg/m^3]	Abs, Inh, Con, Ing	Derm; GI; Resp Irrit; ulceration of nasal septum; Resp, Irrit, Hyper Pig of Skin, [Carc]
Barium (elemental)	---	0.5 mg/m^3	0.5 mg/m^3		50 mg/m^3 (barium components)	Inh, Ing, Con	Resp. Irrit, GI, Muscle Spasm, Eye Irrit, Slow Pulse; skin burns
Benzene*	4.7 ppm	1 ppm	0.5 ppm	5 ppm	[500 ppm]	Inh, Ing, Abs, Con	Irrit Eyes, Nose, Throat; Head, Nau, Derm, Ftg, Anor, Lass, [Carc]
Benzo(a)anthracene (coal tar pitch)	---	0.2 mg/m^3			[80 mg/m^3]	Inh, Con	[Carc], Derm, Bron
Benzo(a)pyrene (coal tar pitch)	---	0.2 mg/m^3	---		[80 mg/m^3]	Inh, Con	[Carc], Derm, Bron
Benzo(b)fluoranthene (coal tar pitch)	---	0.2 mg/m^3	---		[80 mg/m^3]	Inh, Con	[Carc], Derm, Bron

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Benzo(g,h,i)perylene (coal tar pitch)	---	0.2 mg/m^3			[80 mg/m^3]	Inh, Con	[Carc], Derm, Bron
Benzo(k)fluoranthene (coal tar pitch)	---	0.2 mg/m^3			[80 mg/m^3]	Inh, Con	[Carc], Derm, Bron
Bis (2-ethylhexyl) Phthalate**	N/A	5 mg/m^3	5 mg/m^3	10 mg/m^3	[5,000 mg/m^3]	Inh, Ing, Con	[Carc], Irrit Eyes
Cadmium (dust)	---	0.005 mg/m^3	Lowest concentration feasible 0.01 mg/m^3	---	[9 mg/m^3]	Inh, Ing	CNS, Resp, Irrit, Vomit, Cough, Head, Chills, Nau, Diarr, Pulm Edema, Dysp, Chest Tight, [Carc]
Carbazole	---	---	---	---	---	Inh	---
Carbon disulfide	0.1-0.2 ppm	20 ppm	1 ppm	30 ppm	500 ppm	Inh, Abs, Ing, Con	Diz, Head,Ftg, Ner, anorexia, trembling hands, loss of fine motor coord, gastritis, eye, skin burns, Derm
Carbon Tetrachloride***	21.4 ppm	10 ppm	5 ppm	25 ppm	[200 ppm]	Inh, Abs, Con, Ing	CNS Depres, Nau, Vomit, Irrit, Irrit Eyes, Skin, Drow, Dizz, [Carc]
Chlorobenzene***	0.98 mg/m^3	75 ppm	10 ppm	---	1,000 ppm	Inh, Ing, Con	Irrit, Drow, CNS, Depres, Eyes, Skin, Nose, Inco.
Chloroform***	85 ppm	50 ppm	10 ppm	50 ppm	[500 ppm]	Inh, Ing. Con, Abs	Dizz, Dullness, Nau, Head, Ftg, Irrit Eyes, Skin, Conf, [Carc]
Chromium	---	1 mg/m^3	0.5 mg/m^3	---	250 mg/m^3	Inh, Ing, Con	Irrit Eyes, Sens Derm
Chrysene (coal tar pitch)		0.2 mg/m^3	---		[80 mg/m^3]	Inh, Con	Derm, Bron, [Carc]
Cis-1-2-Dichloroethylene	---	200 ppm	200 ppm	----	1000 ppm	Inh, Con, Ing	Irrit Eyes, Resp, CNS Depress
Copper (dusts and mists) (fumes)		1 mg/m^3 0.1 mg/m^3	1 mg/m^3 0.2 mg/m^3	----	100 mg/m^3	Inh, Ing, Con	Vomit, Derm, CNS, Irrit, Derm, Nau, Taste (metallic)
Cyanide	0.9 mg/m^3	5 mg/m^3	5 mg/m^3 (10 min)	5 mg/m^3	25 mg/m^3	Inh, Ing, Abs, Con	Weak, Head, Nau, Conf, Cyan
Dibenzo(a,h)anthracene						Inh, Ing	

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Dichloromethane	540 mg/m^3	25 ppm	50 ppm	125 ppm	[2,300 ppm]	Inh, Abs, Ing, Con	Irrit Eyes, Skin, lass, drow, dizz, Numb, tingl, Nau, [Carc]
Diethylphthalate**	---	None	5 mg/m^3	---	N.D.	Inh, Ing, Con	Irrit Eyes, Skin, Nose, Throat, Head, Dizz, Nau, Lac, Possible Polyneur, Vestibular Dysfunc, Pain, Numb, lass, Spasms in Arms and Legs
Di-n-octylphthalate	---	---	---	---	---	Inh, Ing, Con	---
Dimethylpthalate	---	5 mg/m^3	5 mg/m^3	---	2,000 mg/m^3	Inh, Ing, Con	Irrit, Resp, Abdom
Ethyl Benzene*	8.7 mg/m^3	100 ppm	100 ppm	125 ppm	700 ppm	Inh, Abs, Con	Head. Irrit, Derm, Narc., Irrit Eyes, Skin; Coma
Fluoranthene		0.2 mg/m^3	0.2 mg/m^3			Ing, Inh	[Carc]
Fluorine*	6 mg/m^3	0.1 ppm	1 ppm	2 ppm	25 ppm	Inh, Con	
Fuel Oil/#2	----	----	300 ppm	----		Inh, Abs, Ins, Con	Irrit Eyes, Skin, Derm, Head, Ftg, Blurred Vision, Dizz, Conf
Ideno(1,2,3-cd)pyrene		0.2 mg/m^3				Ing, Inh	
Lead (inorganic forms and dust as Pb)****		0.05 mg/m^3	0.05 mg/m^3		100 mg/m^3	Inh, Ing, Con	Irrit, Cns, Vomit, Narco, Weak, Pall, Insom, Lass, Abdom, Constip
Mercury (organic alkyl compounds) [skin]		0.01 mg/m^3	0.01 mg/m^3	0.03 mg/m^3	2 mg/m^3	Inh, Abs, Ing, Con	Irrit Eyes, Skin; Cough & Chest Pain, Bron Pneu, Tremor, Insom, Irrty, Indecision, Head, Ftg, Weak, Stomatitis, Salv, GI Dist, Anor, Low-wgt, Ataxia
Mercury (compounds)	----	0.1 mg/m^3	0.025 mg/m^3	0.1 mg/m^3	10 mg/m^3	Inh, Abs, Ing, Con	Irrit Eyes, Skin; Cough & Chest Pain, Bron Pneu, Tremor, Insom, Irrty, Indecision, Head, Ftg, Weak, Stomatitis, Salv, GI Dist, Anor, Low-wgt, Ataxia
Methanol	13.1150 mg/m^3	200 ppm	200 ppm	---	6,000 ppm	Inh, Abs, Ing, Con	Irrit Eyes, Skin, Resp, Head, drow, dizz, Nau, Vomit, vis dist, Optic, derm

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Methyl Ether	----	----	---	----	---	Inh	Poison
Methyl Ethyl Ketone (2-Butanone)***	0.7375 mg/m^3	200 ppm	200 ppm	300 ppm	3,000 ppm	Inh, Con, Ing	Irrit Eyes, Skin, Nose, Throat, Head, Dizz, Vomit, Derm
Methylene Chloride	540 mg/m^3	25 ppm	50 ppm	125 ppm	[2,300 ppm]	Inh, Ing, Con, Abs	Ftg, Weak, dizz, drow, Numb, Tingle [carc], Irrit Eyes, Skin, Nau
Mineral Spirit	20 ppm	500 ppm	100 ppm	---	20,000 mg/m^3	Inh, Ing, Con	Irrit Eyes, Nose, Throat, Dizz, Derm, Chemical pneu
Methyl tert butyl ether (MTBE)	---	---	50 ppm	---		Inh, Abs	
Naphtha	0.86 ppm	100 ppm	400 ppm	---	1,000 ppm	Inh, Con, Ing	Light Head, Drow, Irrit, Derm, Irrit Eyes, Skin, Nose
Naphthalene*	0.084 ppm	10 ppm	10 ppm	15 ppm	250 ppm	Inh, Abs, Ing, Con	Eye irritation; headache; confusion, excitement, malaise (vague feeling of ill-being); nausea, vomiting, abdominal pain; irritated bladder; profuse sweating; renal shutdown; dermatitis
Nickel (metal)	---	1 mg/m^3	1.5 mg/m^3	---	[10 mg/m^3]	Inh, Ing, Con	Head, Verti, Nau, Vomit, Pain, Cough, Weak, Convuls, Delirium, Pneu, ,[Carc]
Nitrobenzene	0.0235 mg/m^3	1 ppm	1 ppm	---	200 ppm	Inh, Abs, Ing, Con	Irrit Eyes, Skin, Anoxia, Derm, Anem, Methem
n-Butylbenzene	---	---	---	---	---	---	---
n-Propylbenzene	---	---	---	---	---	---	---
PCBs 42% chlorine (Aroclor 1242)	---	1 mg/m^3 (skin)	1 mg/m^3 (skin)	---	[5 mg/m^3]	Inh, Abs, Ing, Con	Irrit Eyes, Chloracne, Liver Damage [carc]
PCBs 54% chlorine (Aroclor 1254)	---	0.5 mg/m^3 (skin)	0.5 mg/m^3 (skin)	---	[5 mg/m^3]	Inh, Abs, Ing, Con	Irrit Eyes; Chloracne, Liver Damage [carc]

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Petroleum Distillates	---	500 ppm	100 ppm		[1,100 ppm]	Inh, Ing, Con	Dizz, Drow, Head, Dry Skin, Nau, Irrit Eyes, Nose, Throat, [Carc]
Phenanthrene (Coal Tar Pitch)		0.2 mg/m^3	0.2 mg/m^3		[80 mg/m^3]	Inh, Con	Derm, bron, (carc)
Phenol**	0.1786 mg/m^3	5 ppm	5 ppm	---	250 ppm	Inh, Abs, Ing, Con	Irrit Eyes, Nose, Throat, Anor, Low Wgt, Weak Musc Ache, Pain, Dark Urine, Cyan, Liver, Kidney Damage, Skin, Burns, Derm, Ochronosis, Tremor, Convuls, Twitch
Pyrene		0.2 mg/m^3			[80 mg/m^3]	Inh, Con	[Carc]
Sec-Butylbenzene	---	---	---	---	---	---	---
Selenium	N/A	0.2 mg/m^3	0.2 mg/m^3	Unknown	1 mg/m^3	Inh, Ing, Con	Irrit, Head, Fever, Chills, Skin/Eye Burns, Metallic Taste, GI, Dysp, Bron
Silver (metal and soluble compounds as Ag)	----	0.01 mg/m^3	Metal = 0.1 mg/m^3 Soluble 0.01 mg/m^3		10 mg/m^3	Inh, Ing, Con	Blue-gray Eyes, Nasal Septum, Throat, Skin; Irrit, Ulcer, Skin, GI Dist
Tetrachloroethylene (a.k.a. perchloroethylene)***	4.68 ppm	100 ppm	25 ppm	200 ppm	[150 ppm]	Inh, Ing, Con, Abs	Irrit Eyes, Skin, Nose, throat, Resp. Nau, flush face, Neck, dizz, inco, head, drow, eryth, [Carc]
Toluene*	2.14 ppm	200 ppm	50 ppm	300 ppm	500 ppm	Inh, Abs, Ins, Con	Resp, Irrit, Ftg, Conf, Dizz, Head, Derm, Euph, Head, Dilated Pupils, Lac, Ner, Musc FTg, Insom, Pares, Derm, lass
Petroleum Distillates (naphtha)	10 ppm	100 ppm	400 ppm	---	1,000 ppm	Con, Inh, Ing	---
Trans 1,2-Dichloroethylene	0.3357 mg/m^3	200 ppm	200 ppm	---	1,000 ppm	Inh, Con	Irrit, Resp, CNS depress
Trichloroethylene***	21.4 ppm	100 ppm	50 ppm	200 ppm	[1,000 ppm]	Inh, Con, Abs, Ing	Head, Vert, Nau, Vomit, Derm, Vis Dist, Tremors, Som, Nau, Irrit Eyes, Skin, Card Acc., Ftg, [Carc]

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Trichlorofluoromethane	28 mg/m^3	1,000 ppm	1,000 ppm		2,000 ppm	Inh, Con, Ing	Inco, trem, derm, card, asph, frost
Trichlorotrifluoroethane	45 ppm	1,000 ppm	1,000 ppm	1,250 ppm	2,000 ppm	Inh, Con, Ing	Irrit Skin, throat, Drow, Derm, CSN, Depress
Vinyl Chloride***	10-20 ppm	1 ppm	1 ppm	5 ppm	ND	Inh, Con	Lass, Abdom, Gi Bleeding; Hepatomegaly; Pallor or Cyan of Extremities; Liq: Frostbite; [Carc]
VM&P Naphtha (petroleum naphtha)	---	---	300 ppm	---	ND	Con, Ing, Inh	Irrit Eyes, Nose, Throat, Dizz, drow, head, nau, dry skin, chem. Pneumonitis
Xylene*	4.5 mg/m^3	100 ppm	100 ppm	150 ppm	900 ppm	Inh, Ing, Abs, Con	Dizz, Drow, Irrit, Excite, Nau, Vomit, Eyes, Skin, Nose, Throat
Zinc (oxide)	---	5 mg/m^3	2 mg/m^3	---	500 mg/m^3	Inh	Dry Throat, Cough, Chills, Tight Chest, Blurred Vision
4,4′ DDD	---	---	---	---	---	Ing, Inh, Con	---
4,4′ DDE	---	---	---	---	---	Ing, Inh, Con	---
4,4′ DDT	5.0725 mg/m^3	1 mg/m^3	1 mg/m^3	---	[500 mg/m^3]	Inh, Abs, Ing, Con	Irrit Eyes, Skin, Pares, Tongue, Lips, Face, Trem, Anxi, Dizz, Conf, Mal, Head, Lass, Conv, Paresi Hands, Vomit, [Carc]
Aldrin		0.25 mg/m^3	0.25 mg/m^3	---	[25 mg/m^3]	Inh, Abs, Ing, Con	Head, Dizz, Nau, Vomit, Mal, Myo [Carc]
Chlordane [skin]	0.0084 mg/m^3	0.5 mg/m^3	0.5 mg/m^3		[100 mg/m^3]	Inh, Abs, Ing, Con	Blurred vision, confusion, delirium, cough; abdominal pian, nausea, vomiting diarrhea; irritability, tremor, convulsions [Carc]
EDB	76.8 mg/m^3	20 ppm		30 ppm	[100 ppm]	Inh, Abs	Resp. Irr, Eye Irr. [Carc]
Endosulfan I Endosulfan II	---	0.1 mg/m^3	0.1 mg/m^3	---	N.D.	Inh, Abs, Ing, Con	Irrit, Skin, Nau, Conf, Agit, Flush, Dry, Trem, Conv, Head
Endosulfan Sulfate		---	0.1 mg/m^3	---	---	Ing, Con	---

TABLE 1a
CHEMICAL HAZARDS KNOWN OR SUSPECTED ON-SITE

CONTAMINANT	ODOR THRESHOLD	OSHA PEL[1]	TLV (ACGIH)	OSHA CEILING[2] /STEL	IDLH CONC.	ROUTES OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE[3]
Endrin	1.8×10^{-2} ppm	0.1 mg/m^3	0.1 mg/m^{-3}	---	2 mg/m^3	Inh, Abs, Ing, Con	Epil Conv, Stup, Head, Dizz, Abdom, Nau, Vomit, Insom, Agress, Conf, Drow, Lass, Anor
Endrin Aldehyde	1.8×10^{-2} ppm	---	---	---	---	Inh, Con	---
Endrin Ketone	---	---	---	---	---	---	---
Heptachlor	0.02 ppm	0.5 mg/m^3	0.05 mg/m^3	---	[35 mg/m^3]	Inh, Abs, Ing, Con	In animals, Trem, Conv, [Carc]
Heptachlor epoxide	0.02 ppm	---	0.05 mg/m^3	---	---	Ing, Inh	Trem, Conv, [Carc]
Hydrogen Cyanide(Hydrocyanic Acid)	0.9 mg/m^3	10 ppm (11 mg/m^3)	4.7 ppm	4.7 ppm	50 ppm	Con, Inh, Ing, Abs	Asphy & death at high levels; Weak, Head, Conf, Nau, Vomit, Incr. Rate and Depth of Respiration or Respiration Slow and Gasping

NOTES

* = Constituent found in ETPH
**=Constituent found in Acid/Base/Neutral Extractable Compounds
***=Constituent found in Volatile Organic Compounds
****=Constituent found in Leaching Lead

[1]PEL = Permissible Exposure Limit. If no PEL is available, then the NIOSH Threshold Limit Value (TLV) should be used, if available.
[2]Ceiling limit or Short Term Exposure Limit (STEL), if available. Again, the NIOSH TLV may be used if no OSHA standard exists.
[3]Abbreviations are contained on the next page

[ ] = Potential Occupational Carcinogen
ND = Not Been Determined

ABBREVIATIONS

abdom = Abdominal
abs = Absorption
aggress = Aggressiveness
agit = Agitation
anor = Anorexia
anos = Anosmia (loss of the sense of smell)
Anxi = anxiety
anem – Anemia
aspir = Aspiration
asph – asphyxia
bron = Bronchitis
bron pneu = Bronchitis pneumonitis
[carc] = Potential occupational carcinogen
Card = Cardiac arrhythmias
CNS = Central nervous system
conf = Confusion
constip = Constipation
con = Skin and/or eye contact
conv = Convulsions
corn = Corneal
cyan = Cyanosis
defat = Defatting
depres = Depressant/Depression
derm = Dermatitis
diarr = Diarrhea
dist = Disturbance
dizz = Dizziness
drow = Drowsiness
dry = Dry mouth
dysp = Dyspnea (breathing difficulty)
emphy = Emphysema
epil-conv = Epileptiform convulsions
eryth = Erythema
euph = Euphoria
fib = Fibrosis
frost = frostbite
ftg = Fatigue
flush = Flushing
GI = Gastrointestinal
head = Headache
hyperpig = Hyperpigmentation
inco = Incoordination
ing = Ingestion
inh = Inhalation
inj = Injury
insom = Insomnia
irrit = Irritation
irrty = Irritability
lac = Lacrimination (discharge of tears)
lass = Lassitude (weakness, exhaustion)
li-head = Lightheadedness
liq = Liquid
low-wgt = Weight loss
mal = Malaise (vague feeling of discomfort)
malnut = Malnutrition
methem = Methemoglobinemia
myo = Myochonic (jerks of limbs)
mg/m = milligrams/cubic meter
muc memb = Mucous membrane
mus ftg = Muscle fatigue
narco = Narcosis
nau = Nausea
ner = Nervousness
numb = Numbness
optic = Optic nerve damage (blindness)
pall = Facial pallor
parap = Paralysis
ppm = Parts per million
pares = Paresthesia
paresi = Paresis
peri neur = Peripheral neuropathy
pneu = Pneumonitis
prot = Proteinuria
pulm = Pulmonary
peri neur = Peripheral neuropathy
pneu = Pneumonia
prot = Proteinuria
pulm = Pulmonary
repro = Reproductive
resp = Respiratory
skin sen = skin sensitization
salv = Salvation
som = Somnolence (sleepiness unnatural drowsiness)
subs = Substernal (occurring beneath the sternum)
stup = Stupor
sys = System
tingle = tingle limbs
trem – Tremors
verti = Vertigo
vis dist = Visual disturbance
vomit = Vomiting
weak = Weakness

TABLE 1b: Physical Hazards Known or Suspected On-Site

TABLE 1b PHYSICAL HAZARDS KNOWN OR SUSPECTED ON-SITE			
Description of Hazard	**Methods to Identify and Minimize**	**Potential for Occurrence**	**Potentially Affected Tasks**
1. Operating Heavy Equipment	• Utilizing proper equipment operation methods • Maintain safe clearance distances • Wear appropriate eye/ear protection according to manufacturer's recommendations	Moderate	Well drilling and installation. Drilling of sub-slab soil vapor points with hammer drill
2. Inclement weather	• Determine probable weather conditions prior to arrival at site • Avoid working during hurricanes, blizzards, persistent heavy rain or snow, close thunderstorms	Low	Well drilling and installation. Ambient Air Sampling
3. Heat/cold Stress	• Determine probable weather conditions prior to arrival at site • Wear proper clothing • Monitoring of yourself and team mates • Drink plenty of fluids • Utilize work breaks as often as necessary • Avoid working in extreme cold conditions	Low	Well drilling and installation. Drilling of sub-slab soil vapor points with hammer drill
4. Slip, trip, and fall hazards caused by irregular and loose rocky topography	• Wear appropriate footwear to increase traction when possible • Be aware of surroundings	Low	Well drilling and installation. Soil vapor installation and Sampling

TABLE 1b PHYSICAL HAZARDS KNOWN OR SUSPECTED ON-SITE			
Description of Hazard	**Methods to Identify and Minimize**	**Potential for Occurrence**	**Potentially Affected Tasks**
5. Utilities	• Complete a Call Before You Dig markout prior to the work start date • Obtain buried private lines information from and clear sampling locations with Site Contact • Avoid using heavy equipment or drill rig in close proximity to overhead utilities • Inspect sampling areas for Call Before You Dig markings; inspect catch basins and manholes to determine buried pipeline directions prior to sampling • Avoid sampling within area of pavement cuts that may be indicative of buried lines	Moderate	Well drilling and installation. Drilling of sub-slab soil vapor points with hammer drill
6. Vehicle Traffic	• Wear appropriate high visibility clothing • Block off the work area to prevent vehicles from entering	Moderate	High Traffic areas
7. Use of heavy machinery in indoor spaces	• Monitor the indoor air for appropriate gases with a 4-gas meter • Ensure proper ventilation of interior spaces while using gas powered machines • Use appropriate respirator protection and adequate wetting of the area if cutting or drilling through concrete creates silica dust	Low	Drilling of sub-slab soil vapor points with hammer drill
8. Inhalation of Volatiles	• Implement and adhere to action levels stipulated in air monitoring program for volatile organics • Wear appropriate protective equipment • Report potential exposure symptoms immediately • Utilize engineering controls such as fans	Moderate	Well drilling and installation. Drilling of sub-slab soil vapor points with hammer drill

TABLE 1b PHYSICAL HAZARDS KNOWN OR SUSPECTED ON-SITE			
Description of Hazard	**Methods to Identify and Minimize**	**Potential for Occurrence**	**Potentially Affected Tasks**
9. Skin contact with volatile organic compounds, semi volatile organic compounds, metals, TPHs, PCBs, pesticides, cyanide	• Wear appropriate protective clothing • Follow proper decontamination procedures • Report potential exposure symptoms immediately	Low	Well drilling and installation. Drilling of sub-slab soil vapor points with hammer drill

APPENDIX A

Safety and Logistics Planning Call Log

Safety and Logistics Call Log
DEC009808

Date of Call _____

Work Assignment Number / Task _____

DEC Site Name and Number _____

Names of Attendees (and phone #s):

HRP

- HRP PM _____
- HRP SSO _____
- HRP Other _____
- HRP Other _____
- HRP Other _____

Subcontractors

- Driller Contact _____
- Utility Survey _____
- Surveyor _____
- Construction _____
- Other _____

DEC

- DEC PM _____
- DEC Other _____

Other _____

Brief Description Scope of Work (Task Specific): Use additional forms for additional tasks.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Logisitics:

Date of Work: _____

Time to Meet: _____

Site Contact (phone): _____

Notification of Site Contact made by: _____

Describe any unusal site-specific conditions/logistics here (if any): _____

_____

Notes below as needed:

Water Needed? Source Confirmed?	Y / N	_____
Electricity Needed? Source Confirmed?	Y / N	_____
Water Storage Needed?	Y / N	_____
Water Discharges? Permits Needed/Attained?	Y / N	_____
Air Monitoring - CAMP?	Y / N	_____

Will there be intrusive work? Y / N _____

Locations marked in the field? Y / N _____

NYS Code Rule 753/Dig Safe System: Ticket Number: _____

Confirmed that mark-out complete? Y / N

Anticipated Subsurface Conditions (Geology, Utilites, etc.): _____

Anticipated Depth to Groundwater: _____

Will NAPL/Product be Present: Y / N Describe: _____

_____

Safety and Logistics Call Log
DEC009808

Will there be any other parties entering the work zones? Describe control measures:

Lab and Equipment:

Equipment: Y / N PID IP Water Level Indicator CAMP Pumps controllers Survey Eq. GPS
Other: _____

Lab Analytical Required: Y / N VOCs SVOCs Metals PFAS 1,4D PCBs Pest/Herb
Other: _____

Media Tested: Soil Sediment Groundwater Surface Water Sub-slab[soil] Vapor Indoor Air
Notes of sample collection methods: _____

Bottle Order Received/ Checked? Y / N
How will samples be conveyed to lab? _____
Sample TAT? Standard 24 hr TAT 48 hr TAT Other: _____

Review Site - Specific Hazards (per Site-Specific HASP to be provided prior to all parties):

Site Constituents of Concern: (circle)
VOCs HVOCs AVOCs SVOCs PFAS 1,4-Dioxane
metals pesticides herbicides
Asbestos PCBs
Lead Other:_____
Biologicals

Site Setting: Urban Suburban Unoccupied
Traffic Bystanders Crime Plants Animals Vectors
Overhead Utilities Underground Utilities Large Equipment
High Voltage Flood/Tidal Limited Access
Confined Spaces

Task-Specific Chemicals and Hazards (describe): _____
PPE Level (circle): D C B A Modifications: _____
Glove types: _____ Face covering needed? Y/ N
Other specialty PPE: _____

Safe to Work Alone: Y / N
Other Precautions: Y / N Describe: _____

COVID 19 Protocols to be Observed: Y / N

Waste Containment:

How/ where will materials be contained, labelled, stored, or disposed? _____

Miscellaneous:

APPENDIX B
Personnel Log

PERSONNEL LOG				
Name	**Representing**	**Date**	**Time In**	**Time Out**

APPENDIX C
Supervisor's Investigation Report

INCIDENT REPORT

Section 1.0: Complete By Employee and Project Manager

(provide to Human Resources Manager) Incident Case No. _____

Employee Name: Employee Title/Position:	Age: Sex: □ Female □ Male	Time employee began work: Date of Incident: Time of Incident:	Weather Conditions: Date of Report: Time Report Completed:
Department: Office Location: Supervisor:			
Employee Address: Street: City/Town: Zip Code: Phone Number:	Location of Incident: Address: City/Town: State:		

Type of Incident:
□ Motor Vehicle Accident or □ Near Miss or □ Injury occurred during routine work

□ Company or □ Personal Vehicle?

First-Aid performed on-site? Yes / No
Other Medical Attention Provided? Yes / No

Time lost from work? Yes / No Number of Hours: or Number of Days:

If injuries occurred, list names and describe nature, degree, and body part injured: Number of injured:_____

1.

2.

3.

4.

Complete Section 3.0

WITNESS STATEMENT: WHAT HAPPENED AND WHAT WAS THE EMPLOYEE DOING BEFORE THE INCIDENT OCCURRED? WHAT WAS THE EMPLOYEE DOING WHEN THE INCIDENT OCCURRED? WHAT WAS THE EMPLOYEE DOING AFTER THE INCIDENT OCCURRED?	Describe what took place? Who was at fault for vehicle accidents, citation? Was power equipment involved, if so, describe?

WHAT WAS THE NATURE OF THE INJURY OR ILLNESS?	Tell us the body part that was affected and how it was affected – be specific Examples: strained lower back; chemical burn on hand
WHAT WAS THE ROOT CAUSE OF THE INCIDENT? List other individual involved in Section 3. COULD INCIDENT HAVE BEEN AVOIDED? HOW?	Get all the facts by studying the Job and situation involved. Question by use of WHY - WHAT – WHERE – WHEN – WHO – HOW Were there other factors (e.g., noise, ventilation, illumination, fatigue, age, medical conditions) that contributed to the accident?
WAS TRAINING FOR THE WORK ACTIVITY PROVIDED: TYPE: DATES:	WERE WARNING SIGNS OR LABELS POSTED:
WHAT SHOULD BE DONE? HOW CAN INCIDENT BE AVOIDED IN THE FUTURE?	WAS PERSONAL PROTECTIVE EQUIPMENT USED? NEEDED: AVAILABLE: CONTRIBUTED TO INJURY:
WHAT HAVE YOU DONE THUS FAR?	Take or recommend action, depending upon your authority. Follow up – was action effective?
HOW WILL THIS IMPROVE OPERATIONS?	OBJECTIVE Eliminate job hindrances

Completed by:	Reviewed by:	Date

Section 2.0: Complete By Supervisor or Human Resources Manager

Name: Role (witness, observer, injured, participant, etc.):	Address: Phone Number
Name: Role:	Address: Phone Number
Name: Role:	Address: Phone Number
Name: Role:	Address: Phone Number
Name: Role:	Address: Phone Number
Name: Role:	Address: Phone Number

Section 3.0: Corrective Actions (To be Completed by OHSM and CHSO)

Are corrective actions warranted? □ Yes □ No If so, proceed with corrective action list

Corrective Actions. List long term actions to be taken as a result of incident (use additional sheets if needed)	How was the corrective action implemented?	Target date of completion

OHSM Name:	CHSO Name:
OHSM Signature:	CHSO Signature:

End of incident report. Section 4.0 is to be completed and maintained by the Human Resources Department.

Section 4.0: Complete By Human Resources Manager

Incident Report Case No. _____

The information on this page is considered CONFIDENTIAL and must be treated as such. This page will only be available to Human Resources Department or the employee's supervisor.

Insured Name:	Employee Hire Dates: Start at Company: Current Position:
Policy Number:	Is employee a company: Owner, Officer, Neither.
Employee Soc. Sec. No.:	Marital Status: Spouse Name:
Was Employee Pay Interrupted, or paid in full for time:	Employee Pay Period: Weekly, Bi-Weekly, Monthly, Other (specify)
Employee Compensated by hourly or salary? Wage Information: (tips, bonuses, commission)	Typical No. of hours worked per day____, hours per week____. Typical Start of day time_____, end of day time_____.
Date of Stop Work: Date Returned to Work:	How often has employee visited doctor/hospital?
Doctor: Authorized by Co.: Y / N Street: City/Town: Zip Code: Phone Number: Authorized by Co.: Y / N	Hospital: Street: City/Town: Zip Code: Phone Number: Authorized by Co.: Y /N
Was the employee treated in an emergency room? □ Yes □ No	Was employee hospitalized overnight as an in-patient? □ Yes □ No If so, for how many days? _____

APPENDIX D
Daily Job Brief Record

JOB BRIEF RECORD

Person Conducting	367-378 Flushing Ave, Brooklyn, NY Site Name/Address	C224264A HRP Client Name/Job #
Client Contact/Phone	HRP H&S Rep.	Patrick Montuori HRP Supervisor
Date/Time	Number Attending	Weather

Designated Competent Person: _____

Description of Work: _____

_____

_____

_____

Attendees (use additional sheets as needed):

Name	Company	Signature

Emergency Telephone Numbers

FIRE / POLICE / AMBULANCE: 911

Hospital Name & Location: **Woodhull Hospital, 760 Broadway, Brooklyn, NY**

NYSDEC Spill Line: 1-518-457-7362 National Response Center: 800-424-8802 CBYD: 800-922-4455

Health & Safety Manager: Jake Smith: 864.289.0311 1508

HAZARDS

☐ Toxic	☐ Extreme Cold/Heat	☐ Soil Excavation	☐ Vehicle Traffic	☐ Powerwashing
☐ Corrosive	☐ Drains/Sumps	☐ Tank Excavation	☐ Hot Work	☐ Elevated Work Area
☐ Flammable	☐ Sharp Objects	☐ Trenching	☐ Vac Truck	☐ Live Electrical Circuits
☐ Combustible	☐ Drilling in Soil	☐ Floor Holes	☐ Ladders	☐ Pneumatic Tools
☐ Reactive	☐ Lighting	☐ Working on/near Water	☐ Noise	☐ Drum Handling
☐ Path Waste	☒ Slips/Trips/Falls	☐ Underground/Overhead Utilities	☐ Lifting	☐ Abrasive Blasting
☐ Asbestos	☐ Lead			

PERSONAL SAFETY

☐ Supplied Air Respirator	☐ SAR w/Egress Bottle	☐ SCBA	☐ Air Purifying Respirator Cartridge: _____	
☐ Fully Encapsulating Suit	☐ Flash Suit	☐ NOMEX (flam resistant)	☐ Protected Coveralls, Type: _____	
☐ Overboots	☐ Lifebelt/Lanyard	☐ Hardhats	☐ Outer Gloves, Type: _____	
☐ Safety Glasses	☐ Chemical Goggles	☐ Face Shield	☐ Inner Gloves, Type: _____	
☐ Reflective Vests	☐ Eye Wash	☐ Safety Shower	☐ First Aid Kit	☐ PFD's
☐ Hearing Protection	☐ Evacuation Plan	☐ Communications	☐ Properly Sloped Excavation/ Trench	☐ Ventilation

FIRE SAFETY

- ☐ Fire Extinguishers
- ☐ Hot Work Permit
- ☐ Fire Blanket
- ☐ Explosion-Proof Equipment
- ☐ Equipment Grounded & Bonded
- ☐ Non-Sparking Tools
- ☐ Eliminate Ignition Sources
- ☐ Area Kept Wet
- ☐ Smoking Area Designated Location: _____
- ☐ Alarm Box in Area, Location: _____
- ☐ Fire Hose Laid Out

ISOLATE EQUIPMENT

- ☐ Establish Exclusion Zone/Traffic Cones
- ☐ Work Signs
- ☐ Stop Transfers
- ☐ Caution Tape Area
- ☐ GFCIS
- ☐ Temporary Fencing

ELECTRICAL EQUIPMENT

- ☐ LockOut/TagOut
- ☐ Non-Conductive Tools
- ☐ Equipment Grounded
- ☐ FR Suits/Coveralls

AIR MONITORING Type of Meter: _____ Date last calibrated: _____

SUBSTANCE	LEVEL B MAX.	ACTION LEVEL/LEVEL C MAX.	LEVEL D MAX.

Health & Safety Comments / Topics & Safety Rules Reviewed / Questions / Concerns:

_____

_____

_____

_____

_____

_____

_____

Contaminants of Concern: _____

HEALTH & SAFETY SIGNATURE: _____ Date: _____

Is there a Site-Specific or Generic Health & Safety Plan available on-site? Yes ☐ No ☐

☐ HAZARD ZONES NOT APPLICABLE, GENERAL WORK AREA

Level D ☐ Modified Level D ☐ Level C ☐

Anything above Level C, foreman should use a Confined Space Permit/Form.

Note: HOT WORK requires a hot work permit and minimum 20# fire extinguisher. Foreman or HSM must record at least one contaminant of concern above. Toxic plants may be considered a COC if no chemical hazards are expected.

LEVEL C
Respirator Type: _____

Name	Zone	Time In	Time Out	Decon Type

Before performing Level C work, ALL employees must review HRP's Respiratory Protection Program - a copy of which must be on-site along with a HASP.

APPENDIX E
Equipment Calibration Log

EQUIPMENT CALIBRATION LOG		
Instrument	**Calibration Date**	**Calibrated By**

APPENDIX F

COVID-19 Health and Safety Guidelines

COVID19
SITE SPECIFIC HASP ADDENDUM

This addendum will remain in effect until what time the CDC, NIAID, and/or Surgeon General guidance is provided that removes the heightened awareness of social distancing, hand washing, and other protocols in response to COVID-19.

NECESSARY ADDITIONAL SUPPLIES

- Hand sanitizer (minimum 60% alcohol)
- Squeeze bottles of water (if no running water at job site)
- Soap
- Disinfectant (for tools, vehicles, common areas, etc.)
- Caution tape, cones or similar to set up social distancing boundaries as needed

EMPLOYEE HEALTH PROTECTION – ZERO TOLERANCE

The following applies to both HRP employees and contracted staff working on behalf of the HRP or the client.

- ZERO TOLERANCE FOR SICK WORKERS REPORTING TO WORK. IF YOU ARE SICK, STAY HOME! IF YOU FEEL SICK, GO HOME! IF YOU SEE SOMEONE SICK, SEND THEM HOME!
- If you are exhibiting any of the symptoms below, you are to report this to your supervisor (via phone, text or email) right away, and head home from the job site or stay home if already there.
  If you notice a co-worker showing signs or complaining about such symptoms, he or she should be directed to their supervisor (via phone, text or email) and asked to leave the project site immediately.
  COVID-19 Typical Symptoms:
    - Fever
    - Cough
    - Shortness of Breath
    - Sore Throat
    - Loss of taste or smell
- Prior to starting a shift, each employee will verbally self-certify to their supervisor that they:
    - Have no signs of a fever or a measured temperature above 100.3 degrees or greater, a cough or trouble breathing within the past 24 hours.
    - Have not had “close contact” with an individual diagnosed with COVID-19. “Close contact” means living in the same household as a person who has tested positive for COVID-19, caring for a person who has tested positive for COVID-19, being within 6 feet of a person who has tested positive for COVID-19 for about 15 minutes, or coming in direct contact with secretions (e.g., sharing utensils, being coughed on) from a person who has tested positive for COVID-19, while that person was symptomatic.
    - Have not been asked to self-isolate or quarantine by their doctor or a public health official.
    - These self-certifications may be documented at the request of the site owner
- Workers that are working in a confined space or inside a closed building envelope will have to be temperature screened by a Medical Professional or designated individual. Such screening shall be performed out of public view to respect privacy and results are kept private.
- Employees exhibiting symptoms or unable to self-certify should be directed to leave the work

site and seek medical attention and applicable testing by their health care provider. They are not to return to the work site until cleared by a medical professional.

GENERAL ON-THE-JOB GUIDANCE TO PREVENT EXPOSURE & LIMIT THE TRANSMISSION OF THE VIRUS

All Job Sites

- No touching or direct contact with other individuals, including handshaking.
- Wash hands often with soap and water for at least 20 seconds or alternatively when soap and water are not available, use an alcohol-based hand sanitizer with at least 60% ethanol or 70% isopropanol
- A "No Congregation" policy is in effect, individuals must implement social distancing by maintaining a minimum distance of 6-feet from all other individuals
- Avoid face to face meetings – critical situations requiring in-person discussion must follow social distancing
- Conduct all meetings via conference calls, if possible. Do not convene meetings of more than 10 people. Recommend use of cell phones, texting, web meeting sites and conference calls for project discussion
- Be sure to use your own water bottle, and do not share
- To avoid external contamination, bring food from home
- Maintain Social Distancing separation during breaks and lunch.
- To avoid sharing germs, please clean up after yourself. DO NOT make others responsible for moving, unpacking and packing up your personal belongings
- If you or a family member is feeling ill, stay home!

Multi-person job sites (i.e. HRP and subcontractors, etc.)

- Contractor and Field Offices are to be locked down to all but authorized personnel
- Each jobsite should develop cleaning and decontamination procedures that are posted and shared (if multi-person job site). These Procedures must cover all areas including trailers, gates, equipment, vehicles, etc. and shall be posted at all entry points to the sites, and throughout the project site.
- All individual work crew meetings/tailgate talks should be held outside and follow social distancing
- Please keep all crews a minimum of 6' apart at all times to eliminate the potential of cross contamination
- At each job briefing/tool box talk, employees are asked if they are experiencing any symptoms, and are sent home if they are
- Each jobsite should have laminated COVID-19 safety guidelines and handwashing instructions (last page of this addendum)
- All restroom facilities/porta-potties should be cleaned and handwashing stations must be provided with soap, hand sanitizer and paper towels
- All surfaces should be cleaned at least twice a day, including desk, work stations, door handles, laptops, etc.
- All common areas and meeting areas are to be regularly cleaned and disinfected at least once a day but preferably twice a day

- Single person job sites (just one HRP employee, no subs, vendors, etc.)
  - It is that person's responsibility to clean and disinfect all tools and reusable supplies upon return to the office

- Cover coughing or sneezing with a tissue, then throw the tissue in the trash and wash hands, if no tissue is available then cough into your elbow
- Avoid touching eyes, nose, and mouth with your hands

WORK SITE RISK PREVENTION PRACTICES

- At the start of each shift, confirm with all employees that they are healthy.
- All employees will be required to wear gloves (either latex or cut resistant depending on the task at hand)
- Use of eye protection is required (Safety glasses or googles at a minimum with or without face shields).
- In work conditions where required social distancing is impossible to achieve, affected employees shall be supplied PPE including as appropriate a standard face covering, gloves, and eye protection.
- All employees shall drive to work site/parking area in a single occupant vehicle. No one should ride together in the same vehicle
- When entering a machine or vehicle which you are not sure you were the last person to enter, make sure that you wipe down the interior and door handles with disinfectant prior to entry
- In instances where it is possible, workers should maintain separation of 6' from each other per CDC guidelines.
- Multi person activities will be limited where feasible (two person lifting activities)
- Large gathering places on the site such as shacks and break areas will be eliminated and instead small break areas will be used with seating limited to ensure social distancing.
- Contact the cleaning person for your office trailer or office space and ensure they have proper COVID- 19 sanitation processes. Increase their cleaning visits to daily
- Clean all high contact surfaces a minimum of twice a day in order to minimize the spread of germs in areas that people touch frequently. This includes but is not limited to desks, laptops and vehicles

Wash Stations: All sites without ready access to an indoor bathroom or running water MUST install Wash Stations or provide other means for handwashing

- Install hand wash stations with hot water, if possible, and soap at fire hydrants or other water sources to be used for frequent handwashing for all onsite employees.
- All onsite workers must help to maintain and keep stations clean
- If a worker notices soap or towels are running low or out, immediately notify supervisors
- Garbage barrels will be placed next to the hand wash station for disposal of tissues/towels
- If no other alternative exists, bring squeeze bottles with water and soap (only authorized for single employee job sites)

Please Note: This document is not intended to replace any formalized procedures currently in place within the site specific HASP or any job related contracts.

Where this guidance does not meet or exceed the standards put forth by the state, municipality, site owner, contractor or subcontractor, everyone shall abide by the most stringent procedure.

A site-specific COVID-19 Officer (also known as the Health and Safety Officer) shall be designated for every site.

Print and post at each job site

COVID-19/ Health and Safety Officer Name: _____

Phone Number: _____



Any issue of non-compliance with these guidelines shall be a basis for pausing the work. The Health and Safety Officer will address corrective actions with the subcontractor. Any additional issues of non-conformance may be subject to action against the subcontractor's prequalification and certification status.

APPENDIX G

Safety Data Sheets
(for chemicals brought to the site)

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: Alconox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer	**Supplier**
Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040	Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:



Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

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

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

8 Exposure controls/personal protection





8.1 Control parameters :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature:**	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1	**UN Number:** ADR, ADN, DOT, IMDG, IATA	None
14.2	**UN Proper shipping name:** ADR, ADN, DOT, IMDG, IATA	None
14.3	**Transport hazard classes:** ADR, ADN, DOT, IMDG, IATA	
	Class:	None
	Label:	None
	LTD. QTY:	None

US DOT

Limited Quantity Exception: None

Bulk:	**Non Bulk:**
RQ (if applicable): None	**RQ (if applicable):** None
Proper shipping Name: None	**Proper shipping Name:** None
Hazard Class: None	**Hazard Class:** None
Packing Group: None	**Packing Group:** None
Marine Pollutant (if applicable): No additional information.	**Marine Pollutant (if applicable):** No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

	Comments: None	**Comments:** None
14.4	**Packing group:** ADR, ADN, DOT, IMDG, IATA	None
14.5	**Environmental hazards** :	None
14.6	**Special precautions for user:**	None
	Danger code (Kemler):	None
	EMS number:	None
	Segregation groups:	None
14.7	**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.	
14.8	**Transport/Additional information:**	
	Transport category:	None
	Tunnel restriction code:	None
	UN "Model Regulation":	None

15 Regulatory information

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

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other Information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

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 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.

NFPA: 1-0-0

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

HMIS: 1-0-0

SAFETY DATA SHEET

Version 5.2
Revision Date 02/24/2014
Print Date 11/13/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Distilled water

Product Number : 07-6061
Brand : Katayama OEM Partner
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 7732-18-5

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

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : H2O H_2O
Molecular Weight : 18.02 g/mol
CAS-No. : 7732-18-5
EC-No. : 231-791-2

No ingredients are hazardous according to OSHA criteria.
No components need to be disclosed according to the applicable regulations.

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled
If not breathing give artificial respiration

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

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Special hazards arising from the substance or mixture
no data available

5.3 Advice for firefighters
no data available

5.4 Further information
The product itself does not burn.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
For personal protection see section 8.

6.2 Environmental precautions
no data available

6.3 Methods and materials for containment and cleaning up
Wipe up with absorbent material (e.g. cloth, fleece).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
No special storage conditions required.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice.

Personal protective equipment

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 CE 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.

Respiratory protection
No special protective equipment required.

Control of environmental exposure
Prevent product from entering drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	6.0 - 8.0 at 25 °C (77 °F)
e)	Melting point/freezing point	0.0 °C (32.0 °F)
f)	Initial boiling point and boiling range	100 °C (212 °F) - lit.
g)	Flash point	not applicable
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1.000 g/cm3 at 3.98 °C (39.16 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition 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

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
no data available

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

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

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

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component 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 identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: ZC0110000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
not applicable

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

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Taking into account local regulations the product may be disposed of as waste water after neutralisation.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

SARA 313 Components
SARA 313: 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
No SARA Hazards

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
Water	7732-18-5	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2 Revision Date: 02/24/2014 Print Date: 11/13/2016

Hydrochloric Acid,ACS

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

Product name : **Hydrochloric Acid,ACS**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25358**

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:



Corrosive
Serious eye damage, category 1
Corrosive to metals, category 1
Skin corrosion, category 1B



Irritant
Specific target organ toxicity following single exposure, category 3

Corr. Metals 1
Corr. Skin 1B
Eye Damage 1
STOT. SE 3

Signal word :Danger

Hazard statements:
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container
Do not get in eyes, on skin, or on clothing
Wash skin thoroughly after handling
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting

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 IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)
Wash contaminated clothing before reuse
Absorb spillage to prevent material damage
Store in a well ventilated place. Keep container tightly closed
Store locked up
Store in corrosive resistant stainless steel container with a resistant inner liner
Dispose of contents and container to an approved waste disposal plant

Other Non-GHS Classification:

WHMIS

D1A 

E 

NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7647-01-0	Hydrochloric Acid, ACS	30-50 %
CAS 7732-18-5	Water	50-70 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical attention if irritation or coughing persists.

After skin contact: Wash affected area with soap and water. Immediately remove contaminated clothing and shoes.Rinse thoroughly with plenty of water for at least 15 minutes.Immediately seek medical attention.

After eye contact: Protect unexposed eye. Flush thoroughly with plenty of water for at least 15

minutes.Remove contact lenses while rinsing.Continue rinsing eyes during transport to hospital.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Immediately seek medical attention.

Most important symptoms and effects, both acute and delayed:

Inhalation may cause irritation to nose and upper respiratory tract, ulceration, coughing, chest tightness and shortness of breath. Higher concentrations cause tachypnoea, pulmonary oedema and suffocation . Ingestion may cause corrosion of lips, mouth, oesophagus and stomach, dysphagia and vomiting.Pain, eye ulceration, conjunctival irritation, cataracts and glaucoma may occur following eye exposure.Erythema and skin irritation, as well as chemical burns to skin and mucous membranes may arise following skin exposure.;Potential sequelae following ingestion of hydrochloric acid include perforation, scarring of the oesophagus or stomach and stricture formation causing dysphagia or gastric outlet obstruction. In some cases, RADS may develop. Respiratory symptoms may take up to 36 hours to develop.Symptoms of burning sensation, cough, wheezing, laryngitis, shortness of breath, spasm, inflammation, edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Indication of any immediate medical attention and special treatment needed:

Provide SDS to Physician.Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors.If in contact with metals toxic fumes may be released.

Advice for firefighters:

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

Additional information (precautions): Thermal decomposition can produce poisoning chlorine. Hydrochloric acid reacts also with many organic materials with liberation of heat.Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation. Ensure that air-handling systems are operational.

Environmental precautions:

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

Methods and material for containment and cleaning up:

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. Soak up with inert absorbent material and dispose of as hazardous waste. Cover spill with soda ash or calcium carbonate. Mix and add water to form slurry.Wear protective eyeware, gloves, and clothing. Refer to Section 8.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Prevent formation of aerosols. Never use hot water and never add water to the acid.Do not allow contact between hydrochloric acid, metal, and organics.Follow good hygiene procedures when handling chemical materials. Refer to Section 8. Prevent contact with skin, eyes, and clothing. Follow proper disposal methods. Refer to Section 13. Do not eat, drink, smoke, or use personal products when handling chemical substances. Use only in well ventilated areas.Avoid splashes or spray in enclosed areas.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Keep away from food and beverages. Protect from freezing and physical damage. Store away from incompatible materials. Provide ventilation for containers. Keep container tightly sealed.Containers for hydrochloric acid must be made from corrosion resistant materials: glass, polyethylene, polypropylene, polyvinyl chloride, carbon steel lined with rubber or ebonite.

SECTION 8 : Exposure controls/personal protection



Control Parameters: 7647-01-0, Hydrochloric Acid, ACGIH: 2 ppm Ceiling
7647-01-0, Hydrochloric Acid, NIOSH: 5 ppm Ceiling; 7 mg/m3 Ceiling

Appropriate Engineering controls: 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. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of handling.

Respiratory protection: Not required under normal conditions of use. 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.

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: Faceshield (8-inch minimum).Tightly fitting safety goggles.

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**:	Non Explosive Non Explosive
Odor:	Pungent odor	**Vapor pressure**:	5.7mmHg @ 0C
Odor threshold:	0.3 – 14.9 mg/m3	**Vapor density**:	1.27 (Air=1)
pH-value:	< 1	**Relative density**:	1.0 - 1.2

Melting/Freezing point:	- 74 C	**Solubilities**:	Miscible
Boiling point/Boiling range:	81.5 - 110 C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Applicable	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	>1.00	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	non combustible	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined **Hydrochloric Acid:**MW is36.46			

SECTION 10 : Stability and reactivity

Reactivity: Reacts violently with bases and is corrosive.
Chemical stability: No decomposition if used and stored according to specifications.
Possible hazardous reactions: Attacks many metals in the presence of water forming flammable explosive gas (hydrogen).Reacts violently with oxidants forming toxic gas (chlorine).
Conditions to avoid: Incompatible materials.
Incompatible materials: Bases, Amines, Alkali metals, Metals, permanganates (potassium permanganate), Fluorine, Metal acetylides, Hexalithium disilicide.
Hazardous decomposition products: Hydrogen chloride gas.Carbon oxides.

SECTION 11 : Toxicological information

Acute Toxicity:		
Inhalation:	7647-01-0	LD50 Rat 3124 ppm/hour
Oral:	7647-01-0	LD50 Rat 238 - 277 mg/kg
Dermal:	7647-01-0	LD50 Rabbit >5010 mg/kg
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Dermal:	7647-01-0	Skin - rabbit Result: Causes burns.
Ocular:	7647-01-0	Eyes - rabbit Result: Corrosive to eyes
Sensitization:		No additional information.
Single Target Organ (STOT):		7647-01-0: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.

Reproductive Toxicity:	No additional information.

SECTION 12 : Ecological information

Ecotoxicity

7647-01-0: Toxicity to fish LC50 - Gambusia affinis (Mosquito fish) - 282 mg/l - 96 h (Hydrochloric acid)

Persistence and degradability:
Bioaccumulative potential:
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). 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. 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

1789

UN proper shipping name

HYDROCHLORIC ACID

Transport hazard class(es)



Class:
8 Corrosive substances

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

SARA Section 313 (Specific toxic chemical listings):

7647-01-0 Hydrochloric Acid

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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

7647-01-0 Hydrochloric Acid 5000 lbs

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:

None of the ingredients is listed

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%):

7647-01-0 Hydrochloric Acid

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:

IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 01.08.2015
Last updated : 03.20.2015

Nitric Acid, 3M

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

Product name : **Nitric Acid, 3M**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25860**

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:



Oxidizing
Oxidizing liquids, category 3



Corrosive
Serious eye damage, category 1
Skin corrosion, category 1B

Ox. liq. 3
Skin corrosion/irritation - Skin Corr. 1B
Eye Damage 1

Signal word :Danger

Hazard statements:
May intensify fire; oxidizer
Causes severe skin burns and eye damage
Causes serious eye damage

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Keep away from heat/sparks/open flames/hot surfaces. No smoking
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapours/spray
Do not eat, drink or smoke when using this product
Take any precaution to avoid mixing with combustibles
Keep/Store away from clothing/combustible materials
Wash skin thoroughly after handling
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
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
Wash contaminated clothing before reuse
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Specific treatment (see supplemental first aid instructions on this label)
In case of fire: Use agents recommended in section 5 for extinction
Store locked up
Dispose of contents/container to ...

Other Non-GHS Classification:

WHMIS

C 

 E

NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7697-37-2	Nitric Acid	26.03 %
CAS 7732-18-5	Deionized Water	73.97 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical advice if discomfort or irritation persists.

After skin contact: Wash affected area with soap and water. Rinse or flush skin/hair gently with water for at least 30 minutes.Seek immediate medical attention

After eye contact: Protect unexposed eye. Remove contact lens(es) if able to do so during rinsing. Rinse or flush eye gently with water for at least 30 minutes, lifting upper and lower lids.Seek immediate medical attention (ophthalmologist)

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Seek medical attention if irritation, discomfort or vomiting persists.

Most important symptoms and effects, both acute and delayed:

Headache, Shortness of breath.Irritation/burns, all routes of exposure.May cause severe burns, blindness and/or permanent damage. May cause burns, deep penetrating ulcerations of the skin, delayed tissue destruction, redness, pain. May cause gastrointestinal irritation with nausea, vomiting and diarrhea;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Does not burn. Use extinguishing media appropriate for surrounding fire.If in laboratory setting, follow laboratory fire suppression procedures. Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors.Nitrogen oxides (NOx)

Advice for firefighters:

Protective equipment:

Additional information (precautions): Move product containers away from fire or keep cool with water spray as a protective measure, where feasible.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective equipment. Use respiratory protective device against the effects of fumes/dust/aerosol. Keep unprotected persons away. Ensure adequate ventilation.Keep away from ignition sources. Protect from heat.Stop the spill, if possible. Contain spilled material by diking or using inert absorbent. Transfer to a disposal or recovery container.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13

Methods and material for containment and cleaning up:

If in a laboratory setting, follow Chemical Hygiene Plan procedures.Collect liquids using vacuum or by use of absorbents. Place into properly labeled containers for recovery or disposal. If necessary, use trained response staff/contractor.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Prevent formation of aerosols. Follow good hygiene procedures when handling chemical materials. Do not eat, drink, smoke, or use personal products when handling chemical substances. If in a laboratory setting, follow Chemical Hygiene Plan.Use only in well ventilated areas.Avoid splashes or spray in enclosed areas.No smoking.Keep away from heat and sources of ignition.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Store away from foodstuffs. Store away from oxidizing agents.Store in cool, dry conditions in well sealed containers. Keep container tightly sealed.Store with like hazards. Storage class (TRGS 510): Oxidizing

hazardous materials

SECTION 8 : Exposure controls/personal protection






Control Parameters: 7697-37-2, Nitric Acid, NIOSH 4 ppm STEL; 10 mg/m3 STEL
7697-37-2, Nitric Acid , NIOSH 2 ppm TWA; 5 mg/m3 TWA
7697-37-2 , Nitric Acid , ACGIH 4 ppm STEL
7697-37-2, Nitric Acid , ACGIH 2 ppm TWA

Appropriate Engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use/handling.Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.

Respiratory protection: Not required under normal conditions of use. Use suitable respiratory protective device when high concentrations are present. Use suitable respiratory protective device when aerosol or mist is formed. For spills, respiratory protection may be advisable.

Protection of skin: The glove material has to be impermeable and resistant to the product/ the substance/ the preparation being used/handled.Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

Eye protection: Safety glasses with side shields or goggles.

General hygienic measures: The usual precautionary measures are to be adhered to when handling chemicals. Keep away from food, beverages and feed sources. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Do not inhale gases/fumes/dust/mist/vapor/aerosols. Avoid contact with the eyes and skin.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	Not Determined Not Determined
Odor:	strong acrid	**Vapor pressure**:	49 hPa (37 mmHg) at 50 °C (122 °F)
Odor threshold:	0.29 ppm	**Vapor density**:	2.5 (Air = 1)
pH-value:	<1.0	**Relative density**:	1.413 g/cm3 at 20 °C (68 °F)
Melting/Freezing point:	-41.6°C (-42.9°F)	**Solubilities**:	Soluble
Boiling point/Boiling range:	120.5 °C (248.9 °F)	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Determined	**Auto/Self-ignition temperature**:	Not Determined

Evaporation rate:	Not Determined	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Not Determined	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined			

SECTION 10 : Stability and reactivity

Reactivity: Oxidizer.Reacts violently with alcohol, organic material, turpene, charcoal. Violent reaction with Nitric acid + Acetone and Sulfuric acid. Nitric Acid will react with water or steam to produce heat and toxic, corrosive and flammable vapors. (Nitric acid, fuming)
Chemical stability: No decomposition if used and stored according to specifications.
Possible hazardous reactions: Oxidizer: Contact with combustible/organic material may cause fire
Conditions to avoid:excess heat.combustible materials.Incompatible Materials.
Incompatible materials: Highly reactive with alkalis.Reactive with reducing agents. combustible materials. organic materials,metals. Acids.Reducing agents.aldehydes.
Hazardous decomposition products: Nitrogen oxides (NOx)

SECTION 11 : Toxicological information

Acute Toxicity:		
Inhalation:	67 ppm 4 h	Inhalation LC50 Rat
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Dermal:		Rabbit: Corrosive
Ocular:		Rabbit: Corrosive to eyes
Dermal:	Section 2	Classified as causing severe skin burns and eye damage.
Ocular:	Section 2	Classified as causing serious eye damage
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		No additional information.
Reproductive Toxicity:		Experiments have shown reproductive toxicity effects on laboratory animals.

SECTION 12 : Ecological information

Ecotoxicity Persistence and degradability: Readily degradable in the environment.
Bioaccumulative potential:
Mobility in soil: Aqueous solution has high mobility in soil.

Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Product/containers must not be disposed together with household garbage. Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Consult federal state/ provincial and local regulations regarding the proper disposal of waste material that may incorporate some amount of this product.

SECTION 14 : Transport information

UN-Number

2031

UN proper shipping name

Nitric Acid

Transport hazard class(es)



Class:
8 Corrosive substances

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

SARA Section 313 (Specific toxic chemical listings):

7697-37-2 Nitric Acid

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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

7697-37-2 Nitric acid 1000 lbs

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:

None of the ingredients is listed

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%):

7697-37-2 Nitric Acid

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:

IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 12.29.2014
Last updated : 03.23.2015

Methanol, Lab Grade, 4L

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

Product name : **Methanol, Lab Grade, 4L**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25426A**

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



Toxic
Acute toxicity (oral, dermal, inhalation), category 3



Health hazard
Specific target organ toxicity following single exposure, category 1

AcTox Dermal. 3
Flammable liq. 2
AcTox Oral. 3
AcTox Inhaln. 3
Stot SE. 1

Signal word :Danger

Hazard statements:
Highly flammable liquid and vapour
Toxic if swallowed
Toxic in contact with skin
Toxic if inhaled
Causes damage to organs
Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use

Wear protective gloves/protective clothing/eye protection/face protection
Wash skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapours/spray
Keep away from heat/sparks/open flames/hot surfaces. No smoking
Do not breathe dust/fume/gas/mist/vapours/spray
Specific treatment (see supplemental first aid instructions on this label)
IF ON SKIN: Wash with soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
Specific measures (see supplemental first aid instructions on this label)
Take off contaminated clothing and wash before reuse
Wash contaminated clothing before reuse
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
IF exposed: Call a POISON CENTER or doctor/physician
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Store locked up
Store in a well ventilated place. Keep cool
Dispose of contents and container as instructed in Section 13

Other Non-GHS Classification:

WHMIS

B2 

D1B 

D2B 

NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 67-56-1	Methanol	>90 %

Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Get medical assistance.If breathing is difficult, give oxygen

After skin contact: Wash affected area with soap and water. Rinse/flush exposed skin gently using water for 15-20 minutes. Seek medical attention if irritation persists or if concerned.

After eye contact: Protect unexposed eye. Rinse or flush eye gently with water for at least 15-20 minutes, lifting upper and lower lids.Seek medical attention if irritation persists or if concerned

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Dilute mouth with water or milk after rinsing.Get medical assistance.

Most important symptoms and effects, both acute and delayed:

Poison. Toxic by ingestion, absorption through skin and inhalation, potentially causing irreversible effects. Irritating to eyes, skin, and respiratory tract. Irritation- all routes of exposure.Shortness of breath.Nausea.Headache.May be fatal or cause blindness if swallowed. Cannot be made non-poisonous. May cause gastrointestinal irritation, vomiting, and diarrhea. Central nervous system disorders. Skin disorders, preexisting eye disorders, gastrointestinal tract;Toxic: danger of very serious irreversible effects by inhalation, ingestion or absorption through skin. Experiments have shown reproductive toxicity effects on laboratory animals. May cause adverse kidney and liver effects

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: Dry chemical, foam, dry sand, or Carbon Dioxide.Water spray can keep containers cool.

For safety reasons unsuitable extinguishing agents: Water may be ineffective.

Special hazards arising from the substance or mixture:

Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated

Advice for firefighters:

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

Additional information (precautions): Remove all sources of ignition. Avoid contact with skin, eyes, and clothing.Ensure adequate ventilation.Take precautions against static discharge.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Use spark-proof tools and explosion-proof equipment.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.Ensure adequate ventilation.

Environmental precautions:

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

Methods and material for containment and cleaning up:

If necessary use trained response staff or contractor. Remove all sources of ignition. Contain spillage and then

collect. Do not flush to sewer.Absorb with a noncombustible absorbent material such as sand or earth and containerize for disposal. Ventilate area of leak or spill.Use spark-proof tools and explosion-proof equipment.Follow proper disposal methods. Refer to Section 13.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Use in a chemical fume hood. Wash hands before breaks and immediately after handling the product.Avoid contact with skin, eyes, and clothing.Take precautions against static discharge.

Conditions for safe storage, including any incompatibilities:

Store in a cool location. Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Keep container tightly sealed.Store with like hazards. Protect from freezing and physical damage.

SECTION 8 : Exposure controls/personal protection





Control Parameters:	67-56-1, Methanol, ACGIH: 250 ppm STEL; 200 ppm TWA 67-56-1, Methanol, NIOSH: 250 ppm STEL; 325 mg/m3 STEL 67-56-1, Methanol, NIOSH: 200 ppm TWA; 260 mg/m3 TWA
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling. Ensure that dust-handling systems (exhaust ducts, dust collectors, vessels, and processing equipment) are designed to prevent the escape of dust into the work area.
Respiratory protection:	Use in a chemical fume hood. If exposure limit is exceeded, a full-face respirator with organic cartridge may be worn.
Protection of skin:	Select glove material impermeable and resistant to the substance.Select glove material based on rates of diffusion and degradation.
Eye protection:	Safety glasses with side shields or goggles.
General hygienic measures:	Wash hands before breaks and at the end of work. Avoid contact with the eyes and skin.Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.Perform routine housekeeping.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	6 31
Odor:	Alcohol	**Vapor pressure**:	128 hPa @ 20°C
Odor threshold:	Not Available	**Vapor density**:	1.11
pH-value:	Not Available	**Relative density**:	0.79
Melting/Freezing point:	-98°C	**Solubilities**:	Miscible at 20 °C

Boiling point/Boiling range:	64.7°C @ 760mmHg	**Partition coefficient (n-octanol/water)**:	Not Available
Flash point (closed cup):	12°C	**Auto/Self-ignition temperature**:	455°C
Evaporation rate:	5.2	**Decomposition temperature**:	Not Available
Flammability (solid,gaseous):	Flammable	**Viscosity**:	a. Kinematic:Not Available b. Dynamic: Not Available
Density: Not Available			

SECTION 10 : Stability and reactivity

Reactivity: Vapours may form explosive mixture with air.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing.
Conditions to avoid: Excess heat, Incompatible Materials, flames, or sparks.
Incompatible materials: Oxidizing agents, reducing agents, alkali metals, acids, sodium, potassium, metals as powders, acid chlorides, acid anhydrides, powdered magnesium, and aluminum.
Hazardous decomposition products:carbon monoxide, formaldehyde.

SECTION 11 : Toxicological information

Acute Toxicity:		
Dermal:	(rabbit)	LD-50 15800 mg/kg
Oral:	(rat)	LD-50 5628 mg/kg
Inhalation:	(rat)	LC-50 130,7 mg/l
Chronic Toxicity: No additional information.		
Corrosion Irritation:		
Ocular:		Irritating to eyes
Dermal:		Irritating to skin
Sensitization:		No additional information.
Single Target Organ (STOT):		Classified as causing damage to organs:Eyes, skin, optic nerve, gastrointestinal tract, central nervous system, respiratory system, liver, spleen, kidney, blood
Numerical Measures:		No additional information.
Carcinogenicity:		Teratogenicity : has occurred in experimental animals.
Mutagenicity:		Mutagenetic effects have occurred in experimental animals.

Reproductive Toxicity:	Developmental Effects (Immediate/Delayed) have occurred in experimental animals

SECTION 12 : Ecological information

Ecotoxicity

Freshwater Fish: 96 Hr LC50 Pimephales promelas: 28200 mg/L

Freshwater Fish: 96 Hr LC50 Oncorhynchus mykiss: 19500 - 20700 mg/L

Freshwater Fish: 96 Hr LC50 Pimephales promelas: >100 mg/L

Freshwater Fish: 96 Hr LC50 Oncorhynchus mykiss: 18 - 20 mL/L

Freshwater Fish: 96 Hr LC50 Lepomis macrochirus: 13500 - 17600 mg/L

Persistence and degradability: Not persistant.
Bioaccumulative potential: Not Bioaccumulative.
Mobility in soil: Aqueous solution has high mobility in soil.
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Methanol RCRA waste code U154. Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Absorb with a noncombustible absorbent material such as sand or earth and containerize for disposal. Provide ventilation. Have fire extinguishing agent available in case of fire. Eliminate all sources of ignition.Use spark-proof tools and explosion-proof equipment.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

UN1230

UN proper shipping name

Methanol

Transport hazard class(es)



Class:
3 Flammable liquids



Class:
6.1 Toxic substances

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):

67-56-1 Methanol

RCRA (hazardous waste code):

67-56-1 Methanol RCRA waste code U154

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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

67-56-1 Methanol 5000 lbs

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:

67-56-1 Methanol

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%):

67-56-1 Methanol

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:

IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)

CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 01.08.2015
Last updated : 03.27.2015

Sodium Hydroxide, 0.5M

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

Product name : **Sodium Hydroxide, 0.5M**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25881**

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:



Corrosive
Serious eye damage, category 1
Corrosive to metals, category 1
Skin corrosion, category 1B

Skin Corr. 1B
Eye corr. 1
Metal Corr. 1

Signal word :Danger

Hazard statements:
May be corrosive to metals
Causes severe skin burns and eye damage
Causes serious eye damage
Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Keep only in original container
Do not breathe dust/fume/gas/mist/vapours/spray
Wash ... thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Absorb spillage to prevent material damage
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
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
Store in a corrosive resistant/... container with a resistant inner liner
Store locked up
Dispose of contents/container to ...

Other Non-GHS Classification:

WHMIS

E 

NFPA/HMIS



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 1310-73-2	Sodium Hydroxide	2 %
CAS 7732-18-5	Deionized Water	98 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical advice if discomfort or irritation persists.If breathing difficult, give oxygen.

After skin contact: Take off contaminated clothing and shoes immediately.Wash affected area with soap and water.Seek medical attention if irritation, discomfort persist.

After eye contact: Protect unexposed eye. Rinse/flush exposed eye(s) gently using water for 15-20 minutes. Remove contact lens(es) if able to do so during rinsing. Immediately get medical assistance.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Seek medical attention if irritation, discomfort or vomiting persists.

Most important symptoms and effects, both acute and delayed:

Irritation, Nausea,Headache, Shortness of breath.;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: If in laboratory setting, follow laboratory fire suppression procedures. Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors.Thermal decomposition can lead to release of irritating gases and vapors.Sodium oxides.

Advice for firefighters:

Protective equipment: Use NIOSH-approved respiratory protection/breathing apparatus.

Additional information (precautions): Move product containers away from fire or keep cool with water spray as a protective measure, where feasible.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective equipment. Transfer to a disposal or recovery container.Use respiratory protective device against the effects of fumes/dust/aerosol. Keep unprotected persons away. Ensure adequate ventilation.Keep away from ignition sources. Protect from heat.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13

Methods and material for containment and cleaning up:

If in a laboratory setting, follow Chemical Hygiene Plan procedures.Place into properly labeled containers for recovery or disposal. If necessary, use trained response staff/contractor.Collect liquid and dilute with water. Neutralize with dilute acid solutions. Decant water to drain with excess water. Absorb with suitable material. Dispose of remaining solid as normal refuse. Always obey local regulations.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Absorb spillage to prevent material damage due to corrosiveness to metal. Avoid contact with eyes, skin, and clothing. Wash hands after handling. Do not mix with acids.Follow good hygiene procedures when handling chemical materials. Use only in well ventilated areas.

Conditions for safe storage, including any incompatibilities:

Protect from freezing and physical damage.Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Store away from foodstuffs. Store away from oxidizing agents.Store in cool, dry conditions in well sealed containers. Store with Corrosives.

SECTION 8 : Exposure controls/personal protection





Control Parameters:	1310-73-2, Sodium Hydroxide, OSHA PEL TWA 2 mg/m3 1310-73-2, Sodium Hydroxide, ACGIH TLV TWA 2 mg/m3
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use/handling.Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or dusts (total/respirable) below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.
Respiratory protection:	Not required under normal conditions of use. Use suitable respiratory protective device when high concentrations are present. Use suitable respiratory protective device when aerosol or mist is formed. For spills, respiratory protection may be advisable.
Protection of skin:	The glove material has to be impermeable and resistant to the product/ the substance/ the preparation being used/handled.Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
Eye protection:	Safety glasses with side shields or goggles.
General hygienic measures:	The usual precautionary measures are to be adhered to when handling chemicals. Keep away from food, beverages and feed sources. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Do not inhale gases/fumes/dust/mist/vapor/aerosols. Avoid contact with the eyes and skin.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear, colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	Non Explosive Non Explosive
Odor:	Odorless	**Vapor pressure**:	14mmHg @ 20C
Odor threshold:	Not Determined	**Vapor density**:	>1
pH-value:	Alkaline	**Relative density**:	Approx 1
Melting/Freezing point:	Approx 0°C	**Solubilities**:	Soluble in Water
Boiling point/Boiling range:	Approx 100°C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Determined	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	Not Determined	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Not Determined	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined			

SECTION 10 : Stability and reactivity

Reactivity:
Chemical stability: No decomposition if used and stored according to specifications.
Possible hazardous reactions:
Conditions to avoid: Incompatible materials, excess heat

Incompatible materials:acids, Organic materials, Chlorinated solvents, Aluminum, Phosphorus, Tin/tin oxides, Zinc
Hazardous decomposition products:sodium oxides, hydrogen. Carbon oxides (CO, CO2).

SECTION 11 : Toxicological information

Acute Toxicity: No additional information.	
Chronic Toxicity: No additional information.	
Corrosion Irritation: No additional information.	
Sensitization:	No additional information.
Single Target Organ (STOT):	No additional information.
Numerical Measures:	No additional information.
Carcinogenicity:	No additional information.
Mutagenicity:	No additional information.
Reproductive Toxicity:	No additional information.

SECTION 12 : Ecological information

Ecotoxicity Persistence and degradability: Readily degradable in the environment.
Bioaccumulative potential: Not Bioaccumulative.
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Product/containers must not be disposed together with household garbage. Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Consult federal state/ provincial and local regulations regarding the proper disposal of waste material that may incorporate some amount of this product.Neutralize with dilute acid solutions.

SECTION 14 : Transport information

UN-Number

1824

UN proper shipping name

Sodium hydroxide solution

Transport hazard class(es)



Class:
8 Corrosive substances

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):

None of the ingredients is listed

SARA Section 313 (Specific toxic chemical listings):

None of the ingredients is listed

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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

1310-73-2 Sodium Hydroxide 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:

None of the ingredients is listed

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%):

1310-73-2 Sodium Hydroxide

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:
IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 12.14.2014
Last updated : 03.25.2015

SAFETY DATA SHEET

1. Identification

Product identifier: SODIUM BISULFATE

Other means of identification
Product No.: 7432, 3534

Recommended use and restriction on use

Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company Name:	Avantor Performance Materials, Inc.
Address:	3477 Corporate Parkway, Suite 200 Center Valley, PA 18034
Telephone:	Customer Service: 855-282-6867
Fax:	
Contact Person:	Environmental Health & Safety
e-mail:	info@avantormaterials.com

Emergency telephone number:
24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard classification

Health hazards

Serious eye damage/eye irritation Category 1

Label elements

Hazard symbol:



Signal word: Danger

Hazard statement: Causes serious eye damage.

Precautionary statement

Prevention: Wear eye protection/face protection.

Response: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical identity	Common name and synonyms	CAS number	Content in percent (%)*
SODIUM BISULFATE (HYDRATED FORM)		10034-88-5	90 - 100%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth thoroughly. Get medical attention if symptoms occur.

Inhalation: Move to fresh air. Get medical attention if symptoms occur.

Skin contact: Wash skin thoroughly with soap and water. Get medical attention if irritation persists after washing.

Eye contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Causes serious eye damage.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically.

5. Fire-fighting measures

General fire hazards: No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Keep unauthorized personnel away. Use personal protective equipment. See Section 8 of the MSDS for Personal Protective Equipment.
Methods and material for containment and cleaning up:	Sweep up and place in a clearly labeled container for chemical waste. Clean surface thoroughly to remove residual contamination.
Notification Procedures:	Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling:	Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Avoid inhalation of dust. Wash thoroughly after handling.
Conditions for safe storage, including any incompatibilities:	Keep containers tightly closed. Store in cool, dry place. Store in a well-ventilated place.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None of the components have assigned exposure limits.

Appropriate engineering controls	No data available.

Individual protection measures, such as personal protective equipment

General information:	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Eye/face protection:	Wear safety glasses with side shields (or goggles).
Skin protection	
Hand protection:	Use suitable protective gloves if risk of skin contact.
Other:	Wear suitable protective clothing.
Respiratory protection:	In case of inadequate ventilation, use respiratory protection.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	Solid
Form:	Crystals or powder.
Color:	Colorless
Odor:	Odorless
Odor threshold:	No data available.
pH:	1.4
Melting point/freezing point:	58 °C
Initial boiling point and boiling range:	No data available.
Flash Point:	No data available.
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	2.1 (20 °C)
Solubility(ies)	
Solubility in water:	670 g/l
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

Other information

Molecular weight:	138.08 g/mol

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical stability:	Material is unstable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur. The substance is hygroscopic and will absorb water by contact with the moisture in the air.
Conditions to avoid:	Contact with incompatible materials. Moisture. Avoid conditions which create dust.
Incompatible materials:	Strong bases.
Hazardous decomposition products:	Sulfur dioxide gas may be liberated from the product.

11. Toxicological information

Information on likely routes of exposure

Ingestion:	May cause irritation of the gastrointestinal tract.

Inhalation: May cause irritation to the respiratory system.

Skin contact: May cause irritation.

Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: No data available.

Dermal
Product: No data available.

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Skin corrosion/irritation
Product: May cause skin irritation.

Serious eye damage/eye irritation
Product: Causes serious eye damage.

Respiratory or skin sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ cell mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific target organ toxicity - single exposure
Product: No data available.

Specific target organ toxicity - repeated exposure
Product: No data available.

Aspiration hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and degradability

Biodegradation
Product: There are no data on the degradability of this product.

BOD/COD ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration factor (BCF)
Product: No data available on bioaccumulation.

Partition coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil: The product is water soluble and may spread in water systems.

Other adverse effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number:	UN 3260
UN proper shipping name:	Corrosive solid, acidic, inorganic, n.o.s.(SODIUM BISULFATE)
Transport hazard class(es)	
Class(es):	8
Label(s):	8
Packing group:	III
Marine Pollutant:	No

IMDG

UN number:	UN 3260
UN proper shipping name:	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.(SODIUM BISULFATE)
Transport hazard class(es)	
Class(es):	8
Label(s):	8
EmS No.:	F-A, S-B
Packing group:	III
Marine Pollutant:	No

IATA

UN number:	UN 3260
Proper Shipping Name:	Corrosive solid, acidic, inorganic, n.o.s.(SODIUM BISULFATE)
Transport hazard class(es):	
Class(es):	8
Label(s):	8
Marine Pollutant:	No
Packing group:	III

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

None present or none present in regulated quantities.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories

[X] Acute (Immediate) [ ] Chronic (Delayed) [ ] Fire [ ] Reactive [ ] Pressure Generating

SARA 302 Extremely hazardous substance

None present or none present in regulated quantities.

SARA 304 Emergency release notification

None present or none present in regulated quantities.

SARA 311/312 Hazardous chemical

Chemical identity	Threshold Planning Quantity

SARA 313 (TRI reporting)

None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

US state regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

No ingredient regulated by NJ Right-to-Know Law present.

US. Massachusetts RTK - Substance List

No ingredient regulated by MA Right-to-Know Law present.

US. Pennsylvania RTK - Hazardous Substances

No ingredient regulated by PA Right-to-Know Law present.

US. Rhode Island RTK

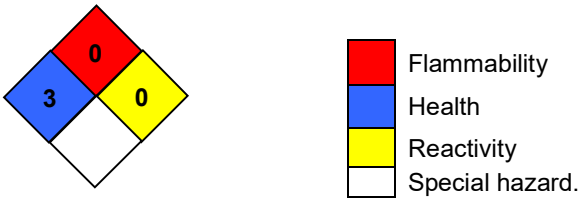
No ingredient regulated by RI Right-to-Know Law present.

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	Not in compliance with the inventory.
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16.Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

Issue date: 05-16-2014

Revision date:	No data available.
Version #:	1.0
Further information:	No data available.
Disclaimer:	THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET (MSDS/SDS) WAS PREPARED BY TECHNICAL PERSONNEL BASED ON DATA THAT THEY BELIEVE IN THEIR GOOD FAITH JUDGMENT IS ACCURATE. HOWEVER, THE INFORMATION PROVIDED HEREIN IS PROVIDED "AS IS," AND AVANTOR PERFORMANCE MATERIALS MAKES AND GIVES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, AND EXPRESSLY DISCLAIMS ALL WARRANTIES REGARDING SUCH INFORMATION AND THE PRODUCT TO WHICH IT RELATES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION, WARRANTIES OF ACCURACY, COMPLETENESS, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY, STABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS MSDS/SDS IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PROPERLY TRAINED PERSON USING THIS PRODUCT, AND IS NOT INTENDED TO BE COMPREHENSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING, STORAGE, OR DISPOSAL OF THE PRODUCT. INDIVIDUALS RECEIVING THIS MSDS/SDS MUST ALWAYS EXERCISE THEIR OWN INDEPENDENT JUDGMENT IN DETERMINING THE APPROPRIATENESS OF SUCH ISSUES. ACCORDINGLY, AVANTOR PERFORMANCE MATERIALS ASSUMES NO LIABILITY WHATSOEVER FOR THE USE OF OR RELIANCE UPON THIS INFORMATION. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS, A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR TO VIOLATE ANY FEDERAL, STATE, LOCAL, OR FOREIGN LAWS. AVANTOR PERFORMANCE MATERIALS REMINDS YOU THAT IT IS YOUR LEGAL DUTY TO MAKE ALL INFORMATION IN THIS MSDS/SDS AVAILABLE TO YOUR EMPLOYEES.

APPENDIX B
Community Air Monitoring Plan

Community Air Monitoring Plan

This Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress during remedial activities at the site. The CAMP is not intended for use in establishing action levels for workers respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. The CAMP was developed in accordance with Appendices 1A & 1B of DER-10, included at the end of this CAMP.

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

Depending on the nature of known or potential contaminants at the site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and groundwater samples. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuing monitoring may be required during sampling activities.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than the background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re- evaluation of activities initiated. Work can resume provided that dust suppression measures

and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

- All readings will be recorded and be available for State (DEC and DOH) personnel to review.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a photo ionization detector (PID) equipped with a 10.2 eV bulb. The PID will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

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

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

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 ppm, 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 predetermined). 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 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 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.

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

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

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.