175 Roger Avenue Commercial Development
Brownfield Cleanup Program Site No. C130164

Section 40; Block L; Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

Remedial Action Work Plan

Prepared for

Inwood 175, LLC & AJM Capital II, LLC
Great Neck, New York 11023

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, New York 11790-3409

Prepared by

Fleming Engineering
158 West 29th Street
New York, New York 10001

April 2021

Professional Engineer's Certification

REMEDIAL ACTION WORK PLAN
175 Roger Avenue
Inwood, NY

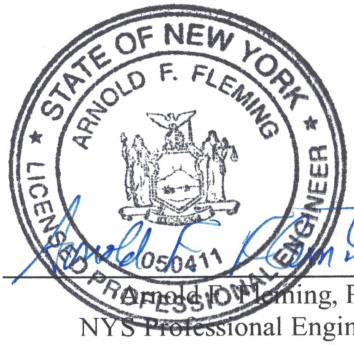
BCP No. C130164

April 2021

I, Arnold F. Fleming, certify that I am currently an NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Action 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).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

10/19/21
Date



Arnold F. Fleming, P.E.
NYS Professional Engineer
License Number 050411

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1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) has been prepared for the property (Site) located at 175 Roger Avenue, Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York. The Site has been admitted into the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP) and is referenced as Site No. C130164. The Volunteer Applicant Inwood 175, LLC (Volunteer) is contract vendee to acquire the Site. The tract occupies 3.5537 acres and is generally level.[1] It is located in an area designated as an En-Zone.

The purpose of this RAWP is to describe the remedial actions necessary to bring the Site into compliance with the cleanup levels commensurate, or better, for its intended use to protect persons on Site, the public, the environment, and future occupants. The RAWP also sets forth engineering and institutional controls beyond Site cleanup that are designed to eliminate pathways to any remaining contamination or otherwise prohibit uses that would expose occupants to remaining contamination. This RAWP was prepared in accordance with DER-10 Technical Guidance, Section 5, and the requirements set forth in the 6NYCRR Part 375 Brownfield regulations.

The Site is zoned Y Industrial by the Town of Hempstead and the Volunteer contemplates developing the property as a warehouse and logistics facility. The planned development will consist of a one to two-story warehouse with ancillary office space and truck bays, parking areas, and outside storage for trailers. As such, the remedy must bring the Site into compliance such that the cleanup meets, at a minimum, the 6NYCRR Part 375 Commercial Use Soil Cleanup Objectives (CUSCOs). The Volunteer proposes to implement a Track 4 Restricted Residential remedy, removing all soils that exceed the 6NYCRR Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs). In the event this cannot be achieved, the fallback will be a Track 4 Commercial Use remedy.

A Supplemental Remedial Investigation (SRI) was completed from January 2020 through May 2020. The purpose was to obtain current data to supplement a Remedial Investigation completed in 2009 (RI) by a prior party in order to fully characterize site contamination and obtain information needed to design the remedy. Based on the SRI, the main contaminant identified was Tetrachloroethene (PCE) and to a lesser extent Trichloroethene (TCE), and the daughter breakdown products of each in groundwater. Groundwater is impacted by PCE, TCE, and xylenes principally in the underground storage tank (UST) area in the northeast corner of the Site (the UST Area) (see Figures 5 and 9). Site soil impacts are minimal, with the only compounds and areas of concern requiring remediation

[1] Notwithstanding anything to the contrary in any other documents associated with the Site, the Site is 3.5537 acres as per the Boundary and Location Survey prepared by Gallas Surveying Group last revised as of February 1, 2021.

are Volatile Organic Compounds (VOCs) in the UST Area and metals in dry wells on the western part of the property. Only a few locations exceed the RRSCOs. A very small area on the south side of the Site contains modestly elevated levels of Semivolatile Organic Compounds (SVOCs) in shallow soils. Free product was not observed at any sampling location during the RI or the SRI.

The principal remedial components include: removal of the remaining concrete cap and asphalt on Site; excavation of source material in soils in the UST Area in the northeast portion of the Site; probing and excavation of source material in dry wells on the western part of the property; probing two areas for possible additional USTs and removal, if present; installation of a two-foot thick soil cap; and installation of a passive Sub-slab Depressurization System (SSDS), which includes a vapor barrier under the proposed building slab; and groundwater monitoring. The passive SSDS will be built such that it can be modified to an active SSDS if warranted by pre-occupancy indoor air sampling and a potential Soil Vapor Intrusion Evaluation (SVI). An environmental easement and institutional controls restricting Site uses and prohibiting the use of Site groundwater will be part of the remedy. Additionally, a Site Management Plan (SMP) will be prepared as part of the remedy to manage remaining contamination.

1.1 Site Location and Description

The Site is located at 175 Roger Avenue, Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York. The Site consists of eight irregular-shaped tax lots that occupy 3.5537 acres (Section 40; Block L; Lots 5, 55, 56, 57, 59, 117, 2579, and 2585 on the Nassau County Land & Tax Map). Roger Avenue borders the Site on the north, Gates Avenue fronts the east, residential buildings and Bayview Avenue lie to the south, and a warehouse owned by Expeditors (a logistics company) borders the Site on the west. Figure 1 presents a Site Location Map and Figure 2 presents a Site Plan. A survey and metes and bounds description is included in Appendix A.

The Site is currently vacant. The concrete building floor slab of the former building occupies approximately one-third of the Site. The balance of the Site is covered with asphalt except for two small areas of broken asphalt and small areas of exposed soil in the northeast corner and south-central portion of the Site. The Site topography is flat. The average Site elevation is approximately 8.5 feet North American Vertical Datum 1988 (NAVD88). Site elevation ranges from 7 feet to 9 feet NAVD88.

1.2 Contemplated Redevelopment Plan

The Volunteer contemplates developing the property as a one to two-story warehouse with ancillary office space and truck bays, parking areas, and outside storage for trailers. The development will also include truck bays and parking areas and outside storage for trailers.

1.3 Description of Surrounding Property

The immediately adjoining properties are a mix of commercial and residential uses. Roger Avenue borders the Site to the north and a parking lot and former Eastern Shell terminal is located further to the northwest. A gravel/soil recycling facility and a Sony Pictures Entertainment building is located northeast of the Site. The Site is bordered by Gates Avenue to the east and D. Daniels Sanitation and MGR Equipment Corporation are located further east across Gates Avenue. Adjoining the Site to the south are several residential properties and adjoining the Site immediately west is a warehouse owned by Expeditors.

1.4 Site History

1.4.1 Past Uses and Ownership

Historically, the Site was developed with a 155,000 square foot, one-story warehouse building and a 2-story warehouse and office, which were constructed in several stages from 1954 to approximately 1967. The Site operated as a "Sheet Metal Fabrication" factory since at least 1961. Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste improperly stored and disposed of on-Site. In June 1992, the United States Environmental Protection Agency (EPA) conducted a Site inspection and discovered approximately (240) 55-gallon deteriorated and/or leaking drums, a 5,000-gallon tanker trailer, underground storage tanks (USTs), and observed dry wells containing sludge materials. In order to address the hazardous condition, the EPA conducted an Emergency Removal Action beginning in August 1993. The drums, tanker trailer, one (1) 1,000-gallon heating oil UST, and UST piping were removed. The Site was then used largely as a warehouse by various tenants from 1990 to 2004 including an auto repair shop (Gunter Auto Shop) and Long Island Party Rentals. The Site was acquired by Nassau County in 1995 and has remained vacant since approximately 2004. The warehouse building was damaged in a fire in February 2011, which ultimately contributed to the rationale for Nassau County to demolish the buildings in 2019. Site ownership varied over the years as follows:

Date	Owner
1954 - circa 1967	Sheet Metal Fabrication
1971 - 1987	Rockaway Metal Products
1993 - 1995	175 Roger Corp.
1995 - Present	Nassau County

According to an environmental database review, the Site contained a number of USTs, the number of which varies depending on the source. There were discrepancies between

the EDR regulatory environmental databases and historical ATC Group reports on the number of USTs. Collectively, there appears to have been upwards of seven (7) USTs historically and potentially four (4) that currently remain abandoned in place. According to the database review, contents of all of the tanks reportedly included fuel oil, gasoline, xylene and naphthalene.

1.4.2 Previous Investigations

The Site was investigated in several previous environmental investigations and remedial documents beginning in 2005. The studies investigated soils, groundwater, soil vapor, Site history, and adjacent land use. Previous investigations and relevant documents include the following:

1. Phase I Environmental Site Assessment of Long Island Party Rentals, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 19, 2005.
2. Site Investigation Report Long Island Party Rentals, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 27, 2005.
3. NYSDEC Brownfield Cleanup Program Remedial Investigation Work Plan, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2007.
4. NYSDEC Brownfield Cleanup Program Remedial Investigation Report, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., July 8, 2009.
5. NYSDEC Brownfield Cleanup Program Alternative Analysis Report Remedial Work Plan, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2010.
6. Draft Phase I Environmental Site Assessment, 175 Roger Avenue, Inwood, New York 11096. Fleming-Lee Shue, Inc., November 2018.

2.0 DESCRIPTION OF SUPPLEMENTAL REMEDIAL INVESTIGATION FINDINGS

A Supplemental Remedial Investigation (SRI) was completed in January 2020 through May 2020. The purpose was to obtain current data to supplement the 2009 Remedial Investigation, in order to fully characterize the Site and obtain information to prepare the Site remedy. This section highlights the SRI findings. The approved SRI report, including the approval letter from NYSDEC, is in Appendix B.

2.1 Geological Conditions

2.1.1 Geology and Soils

Regional Geology

According to Gibbs and Hill 1984[2]:

> The study area [Jamaica Bay and surrounding areas] is included in the Atlantic Coastal Plain Physiographic Province, and is built of pre-Cambrian(?) age crystalline bedrock buried under several hundred feet of late Cretaceous and Pleistocene sediments.
>
> By Cretaceous times (65 to 135 million years ago) the entire area had been reduced to a peneplain (a flat to gently undulating land surface), over which sediments from eroding mountain ranges to the west were being deposited. Following marine invasions and lengthy periods of erosion during the Tertiary (65 to 1.5 million years ago), the Pleistocene was characterized by multiple southward advances of continental glaciers, which by erosion deposition processes shaped the morphology of the region as it is today. The glaciers melted away from the NYC metropolitan area approximately 12,000 to 15,000 years ago (Schuberth, 1968).

Soils

Site soils generally follow a trend of normal to reverse grading with depth, meaning that from the ground surface to approximately 11 to 15 feet below grade, sediments gradually become coarser. From 11 to 15 feet below grade to 35 feet below grade, sediments gradually become finer. This change in grading occurs around 11 to 15 feet below grade.

[2] Gibbs & Hill, Inc., October 1984. *Hydrogeologic Study Fountain Avenue, Pennsylvania Avenue, and Edgemere Landfills,* Part 1- Regional Report.

This grading is characterized by surface soils consisting of non-plastic, medium to fine sands that range from 5 to 10 feet thick (0 - 15 ft.), underlain by non-plastic, sub-rounded to rounded, pebble-sized gravels that range from 1 to 4 feet in thickness (11 - 16 ft.). These gravels occur in medium to coarse sand matrices. Below this layer of gravel, the soil texture changes to fine sands and silty/clayey sands with depth. Some finer and more plastic, silt and clay-rich lenses occur variably across the Site, generally occurring above or below gravels and around 25 to 30 ft. below grade.

Directionally, from north to south, clay and silt lenses alternate from north to south, from approximately 11 to 15 ft. and from 25 to 34 ft. These lenses show no continuity between borings, alluding to these lenses trending laterally in an east-west direction. From west to east, soil trends appear to be finer on the western side of the Site toward Jamaica Bay, with thicker clay and silty clay layers occurring from approximately 12 to 16 ft. and from 24 to 30 ft. The western side of the Site contains less gravel as well, with only a thin sheet of gravel (0.25 feet thick). Conversely the eastern side of the Site consists of coarser grained sediment layers with thicker bands of gravels (2 - 4 ft.). Stratigraphic cross-sections are included in Figure 3.

2.1.2 Hydrogeology

Regional groundwater flow in the water table aquifer is west towards the end of the peninsula on which the Site sits (USGS Water Supply Paper 2498, *Water-table configuration,* plate 3, 1999). Upon reaching the Site, groundwater diverges with a component flowing northwest towards a channel of Jamaica Bay north of the Site and a component flowing southeast toward a channel of Jamaica Bay south of the Site.

On Site, a groundwater divide forms a west-southwest east-northeast oriented hydraulic feature along a line between MW-15 and MW-6 (Figure 4). Based on the wider contour intervals towards the south, less mechanical energy is required to move groundwater in this direction so the bulk of the groundwater flow is to the south. Hydraulic conductivity ranged from 4.2×10^{-5} cm/sec to 5.3×10^{-4} cm/sec and averaged 2.3×10^{-4} cm/sec in eight measurements. The groundwater table lies approximately five feet below the Site surface.

A tidal study was conducted during the SRI to investigate potential tidal influences on groundwater flow and contaminant migration. Ultimately, tidal fluctuations seemed to have little or no material effect on Site groundwater movement and water levels.

2.2 Contaminant Conditions

This section describes soil impacts where remediation will take place. Figure 5 shows where soils exceed the RRSCOs and CUSCOs.

2.2.1 Description of Areas of Concern

There are two areas of concern where soil remediation needs to take place: the UST Area in the northeast part of the Site and the dry wells on the western portion of the property because the soil results exceed the RRSCOs and CUSCOs in the dry wells and to a much lesser extent in the UST Area, where there are remaining USTs. The exact number and condition of the USTs are not fully known, so it is necessary to excavate in the area, empty any USTs if necessary, register, and remove them in order to eliminate possible sources of contamination. The UST Area occupies an approximately 91 ft. by 55 ft. area (5,000 ft^2). There are nine individual dry wells that are approximately eight feet deep. One small area on the southern part of the Site had three SVOC compounds in shallow soils that were above the RRSCOs.

2.2.2 Soil Contamination

Drywells

Most VOCs were below detection limits in the dry wells (Figure 5). In the 11 samples collected, detected VOCs included acetone, carbon disulfide, cis,1,2-DCE, n-propylbenzene, PCE, TCE, 1,3,5-trimethylbenzene, and xylenes. The results for these compounds ranged from <1 µg/kg to approximately 39 µg/kg, and all were below the 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (URSCOs).

Table 1 presents a data breakdown for soil and sludge samples in the dry wells. Most metals results, 75%, are non-detect or close to their URSCOs, and the median concentrations are either non-detect or below 4 mg/kg. The highest concentrations occur in lead, copper, chromium, and zinc. Results above the URSCOs, RRSCOs, and CUSCOs are all sludge samples from dry wells DW-1 through DW-9 at depths of 0.5 ft. or eight feet below grade that were collected by ATC in 2009 and earlier. Drywells DW-1 through DW-9 each had one or more metals above the URSCOs. All dry wells but DW-1, DW-4, and DW-5 had one or more metals above the RRSCOs. DW-2, DW-3, DW-8, and DW-9 had one or more metals above the CUSCOs. DW-3 had the most metals, followed by DW-2, DW-6, and DW-9. Lead most often exceeded the CUSCOs, followed by arsenic, cadmium, mercury, and chromium. Where soil and sludge samples were analyzed for the same metals (arsenic, mercury, cadmium, lead, chromium, and selenium), the median concentrations for all metals was higher in the sludge samples than in the soil samples.

Table 1 – Dry Wells Metals Summary, 2020, mg/kg

Metal	No. Obs.	Min	p25	p50	p75	Max	URSCO	RRSCO	CUSCO
Arsenic	30	nd	nd	2.8	4.5	17	13	16	16
Mercury	30	nd	nd	nd	0.21	4.1	0.18	0.81	2.8
Cadmium	18	nd	nd	1.5	4.1	29	2.5	4.3	9.3
Lead	30	nd	nd	2.2	327	1,730	63	400	1,000
Copper	13	nd	nd	nd	nd	370	50	270	270
Chromium	30	1.7	2.6	3.2	35	286	30	180	1,500
Nickel	13	nd	nd	nd	nd	37	30	310	310
Silver	9	nd	nd	nd	nd	3	2	180	1,500
Selenium	18	nd	nd	nd	nd	9.5	3.9	180	1,500
Zinc	13	nd	nd	nd	20	520	109	10,000	10,000

Min – Minimum value; p25 – 25th percentile; p50 – 50th percentile (median); p75 – 75th percentile; Max – maximum value

UST Area

Most soil VOCs were below detection limits in this area. Detected soil VOCs are either chlorinated or non-chlorinated solvent mixtures and the concentrations for most samples are less than 3,000 µg/kg. Table 2 summarizes the data breakdown for the principal detected VOCs.

Table 2 – UST Area VOCs Summary, 2020, µg/kg

VOC	No. Obs	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Xylenes	26	nd	nd	nd	179	7,060	354,000	260	100,000	500,000
1,3,5-Trimethylbenzene	26	nd	nd	nd	37	632	37,500	8,400	52,000	109,000
n-propylbenzene	26	nd	nd	nd	51	1,930	34,100	3,900	100,000	500,000
Ethylbenzene	26	nd	nd	nd	58	1,370	72,000	1,000	41,000	390,000
Toluene	26	nd	nd	0.38	4.1	399	6,150	700	100,000	500,000
Tetrachloroethene	26	nd	nd	1.2	809	2,810	7,330	1,300	19,000	150,000
Trichloroethene	26	nd	nd	nd	100	581	892	470	21,000	200,000
cis 1,2-dichloroethene	26	nd	nd	3.6	44	101	264	250	100,000	500,000

The principal non-chlorinated VOCs above the URSCOs include ethylbenzene, n-propylbenzene, toluene, 1,3,5-trimethylbenzene, and xylenes at depths of 14 feet below grade or shallower. The only non-chlorinated VOCs above the RRSCOs were ethylbenzene (72,000 µg/kg) and xylenes (354,000 µg/kg), both from SB-5 at 7 feet below grade. All VOCs were below the CUSCOs.

The principal chlorinated VOCs above the URSCOs include PCE and TCE at depths greater than 26 feet below grade. One cis,1,2-DCE soil result at 14 feet below grade exceeded the URSCO. All chlorinated VOCs in soils were below the RRSCOs and CUSCOs.

Most metal soil concentrations in the UST Area, 75%, are below the URSCOs. Of the 28 soil samples collected in this area, arsenic, lead, chromium, and zinc exceeded the URSCOs. Only arsenic exceeded the RRSCO and CUSCO. Table 3 summarizes the metal concentrations for metals above the Part 357 SCOs. Most metal concentrations are below the URSCOs for each metal.

Table 3 – UST Area Metals Summary, 2008 & 2020, mg/kg

Metal	No. Obs.	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Arsenic	28	nd	3	6.7	9.6	16	19	13	16	16
Lead	28	nd	2.9	4.8	8.3	78	139	63	400	400
Chromium	28	3.5	8.3	13	21	38	46	30	180	1,500
Zinc	28	6.2	20	29	47	145	161	109	10,000	10,000

Arsenic exceeded the URSCOs in three samples within the UST Area: SB-13 (28-29), 15.5 mg/kg; SB-14 (29-30), 15.1 mg/kg; and SB-5 (10-11), 18.5 mg/kg. Lead and zinc were above the URSCOs at 5 feet in two samples (ATC samples B-7 and B-14); and was above the RRSCOs and CUSCOs in one sample, SB-5 (10-11), 18.5 mg/kg. Chromium slightly exceeded the URSCOs at depths from 26 to 30 feet in three samples: SB-1 (25-26), 38.4 mg/kg; SB-13 (28-29), 46.2 mg/kg; and SB-14 (29-30), 30.3 mg/kg; and zinc exceeded the URSCOs in SB-14 (29-30), 145 mg/kg.

SB-5 was the only location in the UST Area where VOCs and metals exceeded the RRSCOs. These were in samples SB-5 (6-7) and SB-5 (10-11) for ethylbenzene, xylenes and arsenic. Arsenic, while slightly above the RRSCOs and CUSCOs in a few instances, is believed to represent native soil conditions.

Remainder of Site

One small area on the southern part of the site (sample HA-9) had three SVOC compounds in shallow soils that were above the RRSCOs.

2.2.3 Site Groundwater Contamination

This section describes groundwater conditions throughout the Site. Figures 6 and 7 show groundwater results above TOGS GA AWQS.

Drywells

VOCs in groundwater were all below detection limits in the samples from monitoring wells in the area of the drywells. The only filtered heavy metal detected in groundwater in this area was arsenic in MW-13 at a concentration of 5 µg/L, which is below the TOGS GA AWQS of 25 µg/L.

UST Area

Most of the principal contaminant VOCs in groundwater were above TOGS GA AWQS in the UST Area. Table 4 summarizes the data breakdown for the principal groundwater VOCs in the UST Area.

Table 4 – UST Area Groundwater VOCs Summary, 2020, µg/L

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Xylenes	26	nd	nd	1,455	6,630	45,700	48,700	5
1,3,5-Trimethylbenzene	26	nd	nd	38	219	1,490	1,510	5*
n-propylbenzene	26	nd	nd	51	514	1,120	1,340	5*
Ethylbenzene	26	nd	1.8	267	1,830	7,920	9,470	5
Toluene	26	nd	nd	55	554	16,100	21,800	5
Tetrachloroethene (PCE)	26	nd	nd	9.4	93	3,050	7,610	5
Trichloroethene (TCE)	26	nd	nd	1.1	53	2,650	5,440	5
cis-1,2-DCE	26	nd	1.3	11	169	2,650	3,510	5
Vinyl chloride	26	nd	nd	nd	nd	73	107	2

* Guidance value

Xylenes ranged from non-detect to 48,700 µg/L. The highest xylene concentrations were typically at depths of 15 feet or less, predominantly in temporary wells TMP-5, TMP-13, and TMP-14. The median xylene concentration in this interval is 6,040 µg/L. Below 15 feet, the median concentration is 594 µg/L.

The chlorinated solvents PCE and TCE ranged in concentration from non-detect to 7,610 µg/L and non-detect to 5,440 µg/L, respectively. PCE and TCE concentrations are almost exclusively in the single and double digits in the interval above 30 feet and increase abruptly between 30 to 35 feet where the highest concentrations occur (Figure 7).

There is evidence of natural degradation of chlorinated compounds. The VOCs cis-1,2-DCE and vinyl chloride occur in many samples and appear coincident with the highest PCE and TCE concentrations at 30 to 35 feet.

Of the 26 filtered metals samples in the UST Area, the only detected heavy metals were arsenic, lead and nickel. The maximum filtered concentrations for these metals were 8.2 µg/L, 8.9 µg/L, and 14.2 µg/L, respectively.

Groundwater

Contaminants that exceeded TOGS GA AWQS in the remainder of the Site were largely comprised of the chlorinated solvent PCE and its by-products TCE, cis-1,2-DCE and Vinyl

chloride. PCE, TCE, cis-1,2-DCE and Vinyl chloride concentrations ranged from non-detect to 376 µg/L, non-detect to 780 µg/L, non-detect to 4,750 µg/L, and non-detect to 461 µg/L, respectively. Approximately half of all samples from the Former Plant Area, the Site area encompassed by the outline of the former Warehouse Building and Room outlines, including the extreme southeast portion of the Site and excluding portions of the UST Area (Figure 2), exceed the TOGS GA AWQS for TCE, cis-1,2-DCE and Vinyl chloride, most of which occur at a depth of 15 ft. bgs or lower. Approximately 35% of the PCE samples exceed the TOGS GA AWQS. The progressive increase in concentration of the cis-1,2-DCE and Vinyl chloride daughter products suggests that natural degradation is occurring on-Site (Figure 7).

The only non-chlorinated solvent to exceed the TOGS GA AQWS was Xylene, which ranged from non-detect to 11 µg/L. However, 95% of Xylene samples collected from the remainder of the Site area were non-detect. Table 5 summarizes the groundwater VOCs in the remainder of the Site.

Table 5 – Remainder of Site Groundwater VOCs Summary, 2020, µg/L

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Xylenes	37	nd	nd	nd	nd	9	11	5
1,3,5-Trimethylbenzene	37	nd	nd	nd	nd	0.72	0.91	5*
n-propylbenzene	37	nd	nd	nd	nd	nd	nd	5*
Ethylbenzene	37	nd	nd	nd	nd	2	2.1	5
Toluene	37	nd	nd	nd	nd	nd	1	5
Tetrachloroethene (PCE)	37	nd	1.1	11	89	352	376	5
Trichloroethene (TCE)	37	nd	nd	11	95	619	780	5
cis-1,2-DCE	37	nd	0.94	6.6	269	1,970	4,570	5
Vinyl chloride	37	nd	nd	nd	33	132	461	2

Of the 36 filtered metals samples in the remainder of the Site, the only detected heavy metals were arsenic, chromium, and zinc. The maximum filtered concentrations for these metals were 5.2 µg/L, 14 µg/L, and 27 µg/L, respectively. All of these were below their TOGS GA AWQS. Table 6 summarizes the filtered groundwater metals in the Former Plant Area.

Table 6 – Remainder of Site Filtered Metals Summary, 2020, µg/L

Metal	No. Obs	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Arsenic	36	nd	nd	nd	nd	nd	5.2	25
Lead	36	nd	nd	nd	nd	nd	nd	25
Chromium	36	nd	nd	nd	nd	10	14	50
Zinc	36	nd	nd	nd	nd	25	27	100

2.2.4 Soil Vapor Contamination

A portion of the Site is covered by a concrete slab and most of the remainder is covered with asphalt, with limited areas of exposed soil. The soil vapor samples from below the concrete slab were collected within two inches below the bottom of the slab. The remaining soil vapor samples were collected at a depth of approximately two feet below grade.

Of the VOC compounds analyzed, 49% (34/69) of all results were below detection limits. The results for most of the VOCs are below detection limits or are at very low concentrations. All but three of the soil vapor sampling locations had results below the New York State Department of Health (NYSDOH) soil vapor action guidance value for PCE of 30 µg/m^3. The samples above this guideline were SSV-9 (43 µg/m^3), SSV-10 (548 µg/m^3), and SSV-13 (111 µg/m^3). These are on the eastern side of the Site and the two highest values are near the Site's eastern boundary. For TCE, five of the 17 soil vapor sample results were above the NYSDOH soil vapor action guidance value of 2 µg/m^3. The samples were SSV-8 (6.4 µg/m^3), SSV-9 (12 µg/m^3), SSV-10 (55.4 µg/m^3), SSV-12 (3.4 µg/m^3), and SSV-13 (53.7 µg/m^3). These are on the eastern side of the Site and the two highest values are near the eastern Site border and coincide with the highest PCE soil vapor concentrations. Figure 8 shows the PCE and TCE soil vapor concentrations. Table 7 presents a summary of PCE and TCE in soil vapor.

Table 7 – Soil Vapor Results Summary, 2020, µg/m^3

Soil Vapor VOCs	No. Obs.	Min	p25	p50	p75	Max	NYSDOH Soil Vapor Guidance Value
Tetrachloroethene (PCE)	17	nd	0.14	1.5	14	548	30
Trichloroethene (TCE)	17	nd	0.04	0.45	3.4	55.4	2

2.3 Environmental and Public Health Assessments

The predominant contaminant source is chlorinated solvents and non-chlorinated solvents in groundwater from past industrial use (Figure 7). Parent chlorinated compound concentrations are greatest in the UST Area, where their concentrations are significantly more elevated below 20 feet. Elsewhere on Site, chlorinated solvent concentrations are also

greater below 20 feet. Non-chlorinated compounds are greatest in the UST Area at depths less than 20 feet. Metals are a secondary localized source of contamination. Metal concentrations are greatest as sludge in dry wells DW-1 through DW-9 (Figure 7).

Contaminant Release and Transport Mechanisms

All sources of contamination are at depth or are below paved surfaces and have little potential for adverse impacts in the Site's current state. There is small potential for metals to migrate as they are affixed to soil and sludge primarily within the drywells or are otherwise below grade and more strongly associated with fine soils that typically retain metals strongly. Metals impacted soils are also covered by paved surfaces and/or are at depth so there is no direct exposure pathway. Filtered metals in groundwater are at low concentrations and are all below the TOGS criteria. These factors result in a situation where there is a negligible potential for metals to migrate. There is no discernable release mechanism or exposure unless invasive work is being done.

There are few VOC locations with concentrations indicative of free-phase NAPL, and none was observed during the SRI, suggesting that VOC groundwater impacts are almost exclusively in the dissolved phase, with chlorinated VOC concentrations highest below 20 feet in the UST Area and Xylene concentrations greatest above 15 feet in the UST Area in the northeast part of the Site. Elsewhere, dissolved VOC concentrations decrease significantly on the balance of the Site.

Dissolved phase concentrations move in the direction of groundwater flow direction, which is primarily to the south. There is no outfall for groundwater on Site, so there is no point of contact with groundwater unless invasive work occurs below the groundwater table at approximately five feet.

VOCs do not appear to release into ambient air above the Site based on measurements collected during the SRI. All but a few VOCs in soil vapor appear at relatively low concentrations. Virtually the entire Site is covered by concrete or pavement so there is no direct exposure route to VOCs in soil vapor.

Receptor Population

The receptor population includes occupants of the residences adjoining the Site on the south, occupants of the adjacent commercial operations, passersby, and future Site occupants. The Site is in an undisturbed condition and appears to pose little risk to any of these populations as there have been no elevated vapor, particulate, or soil vapor measurements of any significance observed during sampling and drilling operations. A few exceptions to this occurred in SSV-8 and SSV-2, where TCE soil vapor concentrations slightly exceeded the

New York State air quality guideline, and in SSV-9, SSV-10, and in SSV-13 where PCE and TCE soil vapor levels were above the air quality guidelines. The highest soil vapor levels were in the two samples on the far eastern part of the Site adjacent to Gates Avenue (SSV-10, SSV-13); otherwise soil vapor levels for PCE and TCE were non-detect or below their respective air quality guidelines in most samples. The area is commercial/residential and few passersby were observed during any of the field work.

The principal receptor population is construction workers during remediation and construction of the new facility. This population will be protected by a Health & Safety Plan (HASP) (Appendix E), construction control measures, and engineering and institutional controls.

2.4 Remedial Action Objectives

Based on the results of the RI and SRI, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.4.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil; and
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection:

- Prevent migration of contaminants that would result in groundwater or surface water contamination; and
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.4.2 Groundwater

RAOs for Public Health Protection:

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.
- Remove the source of ground or surface water contamination.

RAOs for Environmental Protection:

- Restore ground water aquifer, to the extent practicable, to pre-disposal/prerelease conditions.

- Prevent the discharge of contaminants to surface water

2.4.3 Soil Vapor

RAOs for Public Health Protection:

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

2.4.4 Identification of Standards, Criteria and Guidance

The soil cleanup goal is the RRSCOs. If endpoint confirmation samples cannot meet the RRSCOs after removal of soil within the areas of concern, then the cleanup goal will be to achieve the CUSCOs.

The groundwater cleanup goals are the TOGS GA AWQS or bulk reduction and asymptotic trends such that groundwater has achieved closure as outlined in Section 6.4 of DER-10, or until NYSDEC otherwise approves termination of groundwater monitoring based on the sampling results.

Currently, there are no standards for soil vapor; however, the NYSDOH, in its document entitled *Guidance for Evaluating Soil Vapor Intrusion in the State of New York,* October 2006, presents a number of matrices for evaluating soil vapor intrusion potential based on sub-slab soil vapor concentrations and indoor air concentrations (guidance levels have been updated in 2013, 2015, and 2017). Since there are currently no buildings at the Site, and hence no indoor air measurements, these matrices are used in conjunction with soil vapor results as guidance only.

The NYSDOH ambient air guideline for PCE is 30 $\mu g/m^3$ and the ambient air guideline for TCE is 2 $\mu g/m^3$. Soil vapor concentration for these compounds were very low across the Site for most of the 17 measurements, with PCE concentrations above the indoor air guideline in three instances and TCE concentrations above the guideline in five instances. The average PCE soil vapor concentration is 44.3 $\mu g/m^3$ and the average TCE soil vapor concentration is 7.9 $\mu g/m^3$. The combination of a new 8-inch-thick concrete slab, passive SSDS including vapor barrier, soil cap, and up to three additional feet of clean soil beneath the slab to raise the elevation to 13 ft. NAVD make it highly unlikely that soil vapor would enter the new building and that soil vapors could be effectively measured from inside the new building.

The passive SSDS will be constructed such that the system can be upgraded to an active system if warranted by the results of indoor sampling and potential SVI prior to building occupancy.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

Section 3 examines the remedial alternatives, the factors considered in their evaluation, and discusses the preferred remedy.

3.1 Alternatives Analysis

There are two remedial alternatives that are practicable considering the intended use, setting, the economic factors driving re-development, and the New York State BCP incentives promoting revitalization of Brownfield sites. The matrix compares a full Track 1 remedial scenario (Alternative 1) with a Track 4 Restricted Residential cleanup (preferred remedy) with a Commercial Cleanup as a fallback (collectively, Alternative 2).

The following standards, criteria and guidance apply to the Site cleanup.

- 6 NYCRR Part 375-3.8 Remedial Program – Specifies the required components of the remedy.
- 6 NYCRR Part 375-6 Soil Cleanup Objectives – Specifies the remedial soil cleanup goals (see Table 8).
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1 – specifies the groundwater cleanup goals (see Table 9).
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation – May 2010 – specifies technical guidance and procedures to follow.
- NYSDOH Generic Community Air Monitoring Plan - specifies community air monitoring requirements (see Table 10).
- NYS Waste Transporter Permits – 6 NYCRR Part 364 - Applies to waste haulers.
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364- applies to non-hazardous waste removal and disposal.

3.1.1 Alternative 1: Removal of All Contaminants to Achieve Track 1 Unrestricted Use

Alternative 1 consists of excavating over the entire area to remove all soils that exceed the URSCOs, in order to attain the Track 1 remedy. No engineering or institutional controls (ECs and ICs) would be necessary under Alternative 1. Under a Track 1 cleanup,

groundwater could require treatment in order to meet the groundwater standards within five years following completion of site remediation.

Alternative 1 is completely protective of public health and the environment and would achieve the RAOs identified for the Site since all contaminated soil would be removed. Alternative 1 would conform to applicable standards, criteria and guidance and will achieve Track 1 URSCOs. It is completely effective in the long-term since all contaminants would be removed, and while it would also be effective in the short-term, there would be greater impacts to the community. The additional excavation associated with Alternative 1 would require longer duration of intrusive activities and community disruption due to traffic, potential odors, vehicle exhaust, and congestion. Alternative 1 would be much more costly and difficult to implement due to the longer duration of active remediation, increased soil disposal quantities, extended support of excavation required for deeper digs, and large-scale dewatering requirements.

3.1.2 Alternative 2: Excavation, & Controls to Achieve Track 4 Restricted Residential Cleanup with Commercial Cleanup as a Fallback

Alternative 2 calls for excavation and off-site removal and disposal of contaminated soil and source material identified during the RI and SRI beneath the UST Area, in and around the dry wells, and removal of any USTs or source material that may be identified during remediation (Figure 9). The Volunteer plans to add Oxygen Release Compound (ORC®), or its equivalent[3], to the UST excavation to enhance groundwater cleanup. The amount of ORC® added will be based on field conditions and observation made by the Remedial Engineer or designee during excavation.

The Volunteer plans to implement a Track 4 remedy using the RRSCOs, with a Track 4 remedy using the CUSCOs as a fallback if removal of all soils exceeding the RRSCOs proves to be impracticable. Excavation of contaminated soil, with the installation of a two-foot-thick clean fill cover layer are the principal means by which remediation in Alternative 2 will take place. The Site engineering controls are a two-foot-thick soil cap over the entire Site and a passive SSDS with a vapor barrier under the floor slab of the proposed building. A visual barrier will be installed beneath the two feet of approved fill in non-building areas.

The passive SSDS will be constructed such that it can be upgraded to an active system if warranted by the results of a SVI. Post-construction indoor air monitoring will be conducted to evaluate whether a SVI is warranted. If a SVI is warranted, the results will be evaluated to determine whether the passive SSDS should be modified to an active SSDS. The remedy does not contemplate removal of arsenic concentrations less than 20 mg/kg as these are believed background concentrations based on the findings of the SRI.

[3] CRS™ or S-MicroZVI®

Alternative 2 contemplates groundwater monitoring following remediation in order to gauge the effectiveness of the remedy. Since source material will have been removed, and the subsurface disrupted as a result of remediation, semiannual groundwater monitoring will continue until the TOGS GA standards have been reached or until asymptotic levels have been attained.

Engineering controls are required in order to prevent contact with remaining soil contamination and chlorinated solvent soil vapor intrusion. A clean fill cap comprised of two feet of approved fill will be installed across the entire Site. A visual barrier will be installed two feet below the cap in non-building areas of the Site. A passive SSDS, capable of being modified to an active SSDS, will be installed beneath the new building slab.

ICs will be implemented to ensure long-term maintenance of the engineering controls and prevent use of Site groundwater, and will be set forth in an environmental easement.

Remedial Alternatives Comparison

Evaluation Criteria	**Alternative 1 Unrestricted Use (Track 1)**	**Alternative 2 Track 4 Restricted Residential Use with Commercial Use as a Fallback**
Overall Protectiveness of Public Health & Environment	Removes all soil contamination, as identified in the RI and SRI. Groundwater is treated by massive volume removal and very deep excavation and extensive Support of Excavation. Remedy is protective of public health and environment and achieves the RAOs identified for the Site.	Removes/caps contamination and source material to depths of 8 to 11± feet identified by the RI and SRI. Future exposure prevented with engineering and institutional controls including a site cap, passive SSDS, and Environmental Easement. The passive SSDS may be activated based on the results of post-construction indoor air sampling and, if warranted, a SVI. The remedy is protective of human health and environment and achieves the RAOs by removing the contaminant source in UST Area and dry wells, and any other sources identified during remediation.
Standards, Criteria, & Guidance	Conforms to cleanup standards, criteria & guidance via full removal of contaminated soil and attainment of a Track 1 cleanup. Removes requirement for engineering and institutional controls.	Conforms to cleanup standards, criteria & guidance via removal to depths determined by the SRI. In all cases, remaining contaminants will be isolated and have no exposure pathway.
Long-Term Effectiveness & Permanence	Completely effective, permanent remedy.	Completely effective, permanent remedy.
Reduction in Toxicity, Mobility, or Volume	Removes mobile source mass and most contaminant volume. Eliminates mobility of contaminants in groundwater by complete removal of contaminant mass.	Removes contaminant source mass. Targets the most contaminated areas and removes the bulk of the contaminant volume. Reduces mobility of

Remedial Alternatives Comparison

Evaluation Criteria	Alternative 1 Unrestricted Use (Track 1)	Alternative 2 Track 4 Restricted Residential Use with Commercial Use as a Fallback
		contaminants in groundwater by removing source and allowing natural degradation of remaining groundwater contamination to achieve groundwater cleanup.
Short-Term Impacts and Effectiveness	Effective in short term, but will require more truck trips for removal, community monitoring, increased traffic, odor and dust controls and soil stockpiling. Increased duration of intrusive activities and community disruption through traffic, and congestion. Highly disruptive to residents and community.	Effective in short term, but will require fewer trucks for removal, community monitoring, increased traffic, odor and dust controls and soil stockpiling. Much less disruptive to community due to significantly shorter remediation time and fewer truck trips.
Implementability	More difficult to implement because of additional excavation required, feasibility of greater volume and depths of excavation; may be infeasible due to equipment/construction limitations and disruption to residents.	More easily and readily implemented with standard construction methods.
Cost-Effectiveness	More costly due to increased soil removal and disposal costs, potential for extensive support of excavation required for deeper digs, increased dewatering requirements and extended duration of active remediation.	More cost effective because limited areas of the Site must be excavated to approximately eight to 11 ft-bgs. Less cost associated with support of excavation, dewatering and duration of remediation.
Community Acceptance	Community acceptance is addressed via the Citizen Participation Plan. Community is largely commercial, but a number of residences border the Site. Expected to cause concern as this alternative is lengthy and very disruptive. Will increase duration and disruption to community because of traffic and noise.	Community acceptance is addressed via the Citizen Participation Plan. Community is largely commercial, but residences border the Site. Shorter time of intrusive activities required that would potentially disrupt the community since excavation is less extensive. Effective controls will be implemented to minimize impacts.
Land Use	Remedy is consistent with contemplated commercial use and surrounding residential uses.	Remedy is consistent with contemplated commercial use and surrounding residential uses.

3.2 Selection of the Preferred Remedy

The preferred remedial alternative is Alternative 2. Alternative 2 is protective of human health and the environment and would achieve the RAOs identified for the Site by

removing any source material and applying ECs and ICs to eliminate any potential for exposure to remaining contamination. Alternative 2 will conform to applicable standards, criteria and guidance via excavation of soils exceeding the RRSCOs/CUSCOs and source material, installation and maintenance of engineering controls and institutional controls. Alternative 2 is more practical and more cost effective since the costs associated with soil disposal, support of excavation/construction, dewatering, and the duration of remediation would be lower than Alternative 1.

Alternative 2 yields the optimum combination of remediation, environmental protection, construction feasibility, and time to completion. Alternative 2 will ensure that concentrations of compounds above regulatory standards will be removed and that there will be no exposure pathway to any remaining contamination. Alternative 2 meets all of the evaluation criteria listed in the Remedial Alternatives Evaluation.

Alternative 2 is selected because it is a completely effective permanent BCP Site remedy that fulfills all of the BCP remedial goals and objectives and leaves the Site in a condition that is protective of human health and the environment.

The following land use factor evaluation examines whether an alternative is acceptable based on the following criteria as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415. This evaluation applies directly to the preferred alternative.

3.2.1 Zoning

The Site is zoned Y Industrial by the Town of Hempstead, with the area abutting the Site to the south zoned Residence C by the Town of Hempstead. The planned Site redevelopment is consistent with applicable zoning requirements (http://www.longislandindexmaps.org/), and will be supported by the preferred remedial alternative.

3.2.2 Surrounding Property Uses

Refer to Section 1.3. The planned redevelopment that will be facilitated by the proposed remedy is consistent with surrounding property uses.

3.2.3 Citizen Participation

A Citizen Participation Plan is included in Appendix C and will be implemented during implementation of the proposed remedy.

3.2.4 Environmental Justice Concerns

There are no known environmental justice concerns on the Site or in the surrounding area that would be negatively affected by the proposed remedy.
https://www.dec.ny.gov/docs/permits_ej_operations_pdf/nassauej.pdf

3.2.5 Population Growth Patterns

According to the US Census Bureau, as of 2019 Nassau County has a population of 1,356,924 and is slow growing at a rate of 1.3% over the last census. The planned Site redevelopment is appropriate for an area of slow growth.

3.2.6 Accessibility To Existing Infrastructure

The Site has access to well-developed infrastructure. It is in the New York metropolitan area and as such has ample water, power, and gas supplies. The Site has access to the Long Island Railroad and local and interstate roads. John F. Kennedy International Airport is located close by.

3.2.7 Proximity to Cultural Resources

There are no significant cultural resources in the vicinity of the Site that would be affected by the proposed remedy.

3.2.8 Proximity To Natural Resources

The Site lies within the boundary of Jamaica Bay, a tidally influenced salt water body. It is near the Jamaica Bay Wildlife Refuge. Campgrounds are located adjacent to Jamaica Bay. Community Parks are close to the Site. Beaches and the Atlantic Ocean are less than three miles away. The proposed remedy will ensure that Site contamination does not migrate to and/or adversely affect these natural resources.

3.2.9 Proximity To Floodplains

The Site is within a designated floodplain. The Site is on a peninsula relatively low to sea level. Site elevation ranges from approximately seven (7) ft. to nine (9) ft. NAVD88 and the average elevation is 8.5 ft. NAVD88. Therefore, portions of the Site, particularly the new building floor slab, must be raised approximately four (4) to five (5) ± feet to elevation 13 feet NAVD88 to comply with Federal Emergency Management Agency (FEMA) flood protection requirements. The top of the floor slab has to be set at a minimum elevation of 13 ft. NAVD88.
https://www.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

https://msc.fema.gov/portal/search?AddressQuery=175%20Roger%20Avenue%2C%20town%20of%20hempstead%2C%20ny

3.2.10 Current Institutional Controls

Nassau County Public Health Ordinance, 2014, prohibits the use of private wells where there is a public water supply. As such, groundwater in the area of the Site cannot be used, and any remaining contamination in groundwater will not pose a high risk of exposure. There are no other ICs in place at this time.

3.3 Summary of Selected Remedial Actions

The Remedial Action contains the following components:

1. Removal of the concrete and asphalt surfaces to facilitate the remedial excavation and clean fill cap installation. Excavation of soil/fill exceeding RRSCOs listed in Table 8, with CUSCOs as a fallback if RRSCOs cannot be attained. Removal of source material;
2. Installation of a visual barrier at two feet below the approved fill in non-building areas;
3. Installation of a passive SSDS under the building slab. Post-construction indoor air sampling will be conducted to assess whether a SVI is needed and whether the passive SSDS needs to be modified to an active SSDS if warranted based on the results of a SVI;
4. Following completion of the proposed redevelopment of the Site, indoor air sampling will be performed in any new structures and if it appears indoor air is being impacted by soil vapor intrusion, and evaluation will be conducted, and if necessary, a mitigation system will be installed and operated;
5. Installation of a vapor barrier containing material such as High-Density Polyethylene (HDPE) Grace Preprufe® 300R plus (membrane thickness 46 mil) or equivalent, including associated design components to install the vapor barrier per manufacturer specifications;
6. Groundwater will be monitored following the remedial action and, if required, additional remedial measures will be implemented, such as *in situ* chemical oxidation;
7. Dewatering, if necessary, to remove source material and soils exceeding the RRSCOs. If dewatering becomes necessary, the fluid will be tested and/or treated before being discharged back into the ground or disposed of at a licensed facility;
8. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;

9. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of the RRSCO remedial criteria;

10. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

11. Import of materials to be used for backfill and two feet of cover cap in compliance with: (1) chemical limits and other specifications included in Appendix D, Soil/Materials Management Plan and (2) all Federal, State and local rules and regulations for handling and transport of material; and

12. All responsibilities associated with the Remedial Action, including permitting requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed on the Site in accordance with this NYSDEC-approved RAWP and the NYSDEC-issued Decision Document. Any deviations from the RAWP and/or Decision Document will be promptly reported to NYSDEC and fully explained in the Final Engineering Report (FER).

4.0 REMEDIAL ACTION PROGRAM

Section 4 discusses the administrative and Site preparation aspects of the remedial program.

4.1 Governing Documents

The following governing documents apply to this remedial program.

4.1.1 Site Specific Health & Safety Plan

All remedial work performed under this RAWP will be in compliance with governmental requirements, including Site and worker safety requirements mandated by the Federal Occupational Safety and Health Administration (OSHA).

All parties performing the remedial construction work are responsible for preparation of an appropriate HASP that meets the requirements of the HASP included in Appendix E, and for the appropriate performance of work according to that plan and applicable laws. Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

The HASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion (COC).

The Site Safety Coordinator will be Jordan Arey.

4.1.2 Quality Assurance Project Plan (QAPP)

The QAPP describes the methods and procedures to be followed during remediation and includes protocols that will be followed during environmental sampling, monitoring well installation, decontamination, sample handling and management, and project organization. (Appendix F)

4.1.3 Construction Quality Assurance Plan (CQAP)

Installation of the vapor barrier will be conducted in accordance with the manufacturer's instructions such that it maintains the integrity of the warranty. The installation shall be inspected and approved by the Remedial Engineer or its designee.

The two-foot-thick protective cap consisting of approved fill will be pre-approved by NYSDEC, based upon documentation demonstrating that it meets on-site use criteria. All imported material will be inspected by the Remedial Engineer or its designee to ensure consistency with the approved specifications. Prior to placement of backfill and the protective cap, the elevation of remaining site soil will be surveyed by a licensed surveyor and recorded on a survey that will also include finished grade elevations. This survey will be included in the FER and Site Management Plan (SMP).

4.1.4 Soil Management Plan (SoMP)

A Soil Management Plan is included as Appendix D.

4.1.5 Storm Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control (Appendix G).

4.1.6 Community Air Monitoring Plan (CAMP)

A Community Air Monitoring Plan is included in Appendix H. The Remedial Engineer or its designee will implement the CAMP during all times when invasive remedial work is conducted at the Site, and will record a log of CAMP activities in daily reports of Site activity. Any exceedances or complaints, and response measures will be reported to the NYSDEC project manager within 24 hours, and will be included in the weekly report.

4.1.7 Contractors Site Operations Plan (SOP)

The Remedial Engineer will review all plans and submittals for this remedial project (including those listed above and contractor and subcontractor document submittals) and confirm that they are in compliance with this RAWP. The Remedial Engineer is responsible to ensure that all later document submittals for this remedial project, including contractor and subcontractor document submittals, are in compliance with this RAWP.

4.1.8 Citizen Participation Plan

A certification of mailing will be sent by the Volunteer (or the Remedial Engineer) to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing. The approved Citizen Participation Plan for this project is attached in Appendix C.

Document repositories have been established at the following locations and contain all applicable project documents:

Peninsula Public Library
280 Central Avenue
Lawrence, NY 11559
Phone: 516-239-3262
Hours:

Monday - Thursday	9 AM – 9 PM
Friday	9 AM – 6 PM
Saturday	9 AM – 5 PM
Sunday	12 PM – 5 PM

https://www.peninsulapublic.org/

Library hours and access are curtailed during COVID-19. The library should be contacted directly for access.

NYSDEC Region 1
50 Circle Road
Stony Brook, NY
631-444-0240
Hours: Mon-Fri 8:30 AM – 4:45 PM (Call for Appointment)

NYSDEC is making site project documents available online through the DECinfo Locator at: https://www.dec.ny.gov/data/DecDocs/C130164/

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

This section includes a list of people who will be responsible for the Remedial Action work.

Remedial Engineer	Arnold F. Fleming, P.E.
Project Manager/	
Health & Safety Officer	Steven E. Panter
Field Lead	Jordan Arey
Field Engineer	Benjamin Hess
QA/QC Officer	Joel Kane

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Arnold F. Fleming, P.E (DBA Fleming Engineering). The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the 175 Roger Avenue Site (NYSDEC BCP Site No. C130164). The Remedial Engineer will certify in the FER that the remedial activities were observed by qualified professionals under his supervision and that the remediation requirements set forth in the RAWP

and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed in Section 7.1 of this RAWP.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH. The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

4.2.3 Remedial Action Schedule

Brownfield Site Remediation Schedule

Item	Date
Remedial Excavation Begins	August 1, 2021
Complete Excavation	November 3, 2021
Submit Final Engineering Report for Review	January 31, 2022
Submit Site Management Plan for Review	February 28, 2022

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the Town of Hempstead construction code requirements or according to specific variances issued by that agency. NYSDEC will be notified by the Volunteer of any variances issued by the Town.

4.2.5 Site Security

Site security will be provided by a fence that surrounds the Site and has controlled access through a locked gate. Additional internal barricades may be used around open excavations inside the Site boundary, as needed.

4.2.6 Traffic Control

It is anticipated that fewer than 40 trucks per day for two to four weeks will be required during the maximum period of soil removal.

The RAWP contemplates queuing of trucks along Roger Avenue, west of Gates Avenue. This stretch of Roger Avenue is commercial. Idling will not be permitted. Trucks will enter and leave

the Site from the entrance on Roger Avenue. The contemplated truck route is from the Site east onto Roger Avenue, right (south) onto Gates Avenue, then left along Bayview Avenue until reaching the Nassau Expressway (Interstate 878).

This is the most appropriate route and considers: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation.

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

Egress point(s) for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation. The egress point(s) will have a truck decon station.

Queuing of trucks will be performed on-Site and on Roger Avenue and Gates Avenue in order to minimize off-Site disturbance.

4.2.7 Contingency Plan

If USTs, source material, or other unidentified elements arise during remediation, they will be managed in accordance with all federal, state, and local regulations and any material will be disposed of in licensed, regulated facilities. All unforeseen elements will be managed according to DER-10 procedures and the NYSDEC project manager notified of these developments.

4.2.8 Worker Training and Monitoring

All Site workers conducting excavation and other work below the existing Site cover slab and asphalt will have 40-hour HAZWOPER site safety training and medical monitoring along with up-to-date 8-hour refresher training.

4.2.9 Agency Approvals

All permits or government approvals required for remedial construction will be obtained prior to the start of remedial construction.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial work is attached in Table 11. This

list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the FER.

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in Table 12. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Action Costs

The total estimated ballpark cost of the Remedial Action is $2,761,000. An estimated breakdown is as follows:

Contractor Mobilization/Excavation	$ 100,000	
Permits (Table 11)	$ 5,000	
Pad Removal & Disposal	$ 100,000	
Soil Disposal	$ 436,000	
Existing Groundwater Well Decommissioning	$ 20,000	
ORC®	$ 5,000	
Passive SSDS with Vapor barrier	$ 100,000	
Clean Backfill Excavation	$ 218,000	
Two-foot Cap Backfill	$ 689,000	
Visual Barrier	$ 20,000	
Spread two-foot Cover	$ 50,000	
Remedial Oversight	$ 50,000	
CAMP Monitoring	$ 31,000	
Soil Sampling/Waste Classification	$ 15,000	
Final Engineering Report	$ 35,000	
Final Engineering Report Legal Review	$ 10,500	
General Consulting	$ 25,000	
Site Management Plan	$ 25,000	
Site Management Plan Legal Review	$ 9,500	
Soil Vapor Intrusion Investigation	$ 10,000	
Convert Passive SSDS to an Active System	$ 6,000	
Groundwater Well Installation	$ 20,000	
Groundwater Monitoring	$ 225,000	Assumes 10 years
Groundwater Well Decommissioning	$ 20,000	
Indoor Air Sampling	$ 25,000	Assumes 5 years
Annual Site Inspections	$ 100,000	Assumes 50 years
Annual Periodic Review Reports	$ 400,000	Assumes 50 years
Environmental Easement	$ 11,000	
Total	**$2,761,000**	

This will be revised based on actual costs and submitted as an appendix to the FER.

4.3 Site Preparation

4.3.1 Mobilization

Site mobilization will be conducted under the approved RAWP and consist of bringing equipment onto the Site, preparing health and safety exclusions zones, establishing a truck wash, staging areas, and access/egress point.

4.3.2 Erosion and Sedimentation Controls

Erosion and sedimentation controls will be implemented in accordance with the Storm Water Pollution Prevention Plan included in Appendix G.

4.3.3 Stabilized Construction Entrance(s)

Stabilization of construction entrance will be implemented under the RAWP. A truck wash and collection pit, or equivalent, will be installed to remove soil from trucks before leaving the Site. Trucks will be inspected and cleaned just before they reach the street. Truck wash waters will be collected and disposed of at licensed disposal facilities.

4.3.4 Utility Marker and Easements Layout

The Volunteer and its contractors are responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Volunteer and its contractors are responsible for safe execution of all invasive and other work performed under this RAWP. The Volunteer and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfying these requirements.

Utilities and easements on Site have been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on Site.

4.3.5 Sheeting and Shoring

It is not anticipated that any sheeting or shoring will be required to remediate the Site. In the event that it is, appropriate management of structural stability of on-Site or off-Site structures during on-Site activities, including excavation, is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other

work performed under this RAWP. The Volunteer and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this RAWP. Further, the Volunteer and its contractors are responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.6 Equipment and Material Staging

Equipment and material will be staged in available on-Site areas. Anticipated equipment includes track hoe(s)/excavators, front end loaders, baker tanks, water tanks, trucks, and personnel vehicles. Staged materials will include imported backfill and capping material. Equipment and supplies will be brought on Site on an as needed basis, so as to minimize on-Site staging and maintain freedom of movement on Site. Stockpiling of excavated material will be minimized, and will be managed in accordance with the procedures described in Section 5.4.2 below.

4.3.7 Decontamination Area

A decontamination area will be set up at the egress point during all times when invasive work is conducted at the Site. These will move and additional decontamination areas will be set up depending on the specific work areas. This area serves as a location to decontaminate equipment as necessary during the remediation and is distinct from the truck wash decontamination.

4.3.8 Site Fencing

A fence with access control encircles the BCP Site.

4.3.9 Demobilization

Demobilization included decontamination of equipment used on Site, removal of temporary structures used during remediation, restoration of disturbed areas such that they are ready for building, removal of truck wash areas, sediment and erosion control measures, and general trash cleanup.

4.4 Reporting

All weekly and monthly Reports will be included in the FER.

4.4.1 Weekly Reports

Weekly reports will be submitted to NYSDEC and NYSDOH project managers by the end of each week following the reporting period and will include:

- An update of progress made during the reporting week;

- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and
- An explanation of notable Site conditions.

Weekly reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP, or other sensitive or time critical information. Emergency conditions and changes to the RAWP will be addressed directly to the NYSDEC project manager via personal communication.

Weekly reports will include a description of daily activities keyed to an alpha-numeric, or equivalent, map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public. The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH project managers by the tenth day of the following month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. quantity of tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative

photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be included in the weekly reports as needed, and a comprehensive collection of photos will be included in the FER. Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions will be addressed by notifying the NYSDEC of the complaint and investigating the cause/source of the issue. Corrective measures will then be formulated and put into place to address the complaint as soon as possible.

4.4.5 Deviations from the RAWP

Deviations from the RAWP will only be made if warranted by reasonable action or by uncontrolled or unavoidable conditions. The reasons for the deviation and its impact on the overall remedy will be documented and sent to the NYSDEC. If deviations are known in advance, they will be discussed and approved by the NYSDEC before being executed.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE, BACKFILL AND CLEAN FILL CAP

The remedial action consists of contaminated soil and source material removal to meet a Track 4 cleanup using the RRSCOs, or in the event the RRSCOs cannot be attained, a Track 4 cleanup will be implemented using the CUSCOs. Excavation is planned in the UST Area; the dry wells; and around individual USTs, if found outside of the UST Area, and will generally occur to depth of approximately seven to 11 feet below current ground surface grade. ORC®, or its equivalent, will be added to the UST excavation to enhance groundwater cleanup. The amount of ORC® added will be based on field conditions and observation made by the Remedial Engineer or designee during excavation.

Material pre-approved by NYSDEC will be used as backfill and a minimum of two feet will be placed Site-wide to serve as a protective cap over Site soils. Figure 9 shows the locations to be remediated and approximate environmental cut depths.

A two-foot thick soil cap will be placed over the entire Site footprint. The material will be pre-approved by NYSDEC, but the Volunteer contemplates the fill meeting the RRSCOs will be acceptable (Part 375-6.7(d)). The cap will provide a cover over any remaining contamination above the soil cleanup objectives and provide sufficient distance from the shallow water table/capillary fringe to allow installation of a passive SSDS.

Groundwater remediation will be accomplished by removal of the source material. The Volunteer intends to demonstrate a bulk reduction in PCE and TCE levels in groundwater achieving asymptotic levels where concentrations remain above groundwater quality standards. The Site is located in an urban area with a local prohibition on groundwater use, so adding an institutional control prohibiting use would be consistent with the local use restriction already in place.

5.1 Soil Cleanup Objectives

The Soil Cleanup Objectives are the Protection of Public Health RRSCOs, listed in Table 8. A Commercial use Track 4 is the fallback, if Track 4 using the RRSCOs cannot be achieved.

5.2 Remedial Performance Evaluation (Post Excavation End-Point Sampling)

Endpoint sampling will be completed in accordance with DER-10.

5.2.1 End-Point Sampling Frequency and Methodology

Bottom post-excavation confirmation samples will be collected to document endpoint conditions at a sampling rate of one endpoint sample/900 ft^2 (approximate 30-ft. center spacing) in the UST Area and one bottom sample per location in the area of excavation of each dry well, or individual USTs, if found. Bottom endpoint samples will be collected from the excavator bucket from soil

at the bottom of the excavation where an excavation is deeper than three feet. No one will enter an excavation.

Sidewall post-excavation samples will be collected around the perimeter of the UST Area excavation at a minimum rate of one sample per 30 linear feet, and will be collected in the approximate center of the contaminated interval where possible. Additional sidewall samples may be collected if warranted by Site conditions.

Post-excavation samples will be collected for Target Compound List (TCL) VOCs and Target Analyte List (TAL) metals in the UST Area and Target Analyte List (TAL) metals only in the dry wells. Should any UST be found and require remediation, the post-remediation soils will be sampled for TCL VOCs.

5.2.2 Reporting of Results

Endpoint results will be reported in tables with the applicable SCOs for comparison. Endpoint sample results may be reported to the Department on an ongoing basis so as to closeout specific excavation areas as they are excavated and meet the soil cleanup goals.

5.2.3 Quality Assurance/Quality Control

Post-excavation samples will be collected for TCL VOCs and TAL metals. The Quality Assurance/Quality Control (QA/QC) Plan in Appendix F presents the method numbers, and sample collection information.

5.2.4 Data Usability Summary Report

Data Usability Summary Reports (DUSRs) will be completed for all endpoint samples.

5.2.5 Reporting of End-Point Data in FER

The FER will contain the endpoint results in tabular form along with a comparison to the appropriate SCOs. The tables will highlight endpoint results above the SCOs. A spider map showing all SCO exceedances will also be presented in the FER.

Laboratories used for all end-point sample results and contingency sampling will be NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified.

End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements

5.3 Estimated Material Removal Quantities

The material to be removed was determined by the results of the RI and SRI. Soil removal will occur in the UST Area and dry wells, and individual USTs, if found. Figure 9 shows the locations to be remediated and approximate environmental cut depths and their locations.

The estimated quantity of soil/fill to be removed from the Site is 2,600 tons (1,735 cubic yards). The estimated quantity of soil to be imported into the Site for backfill and cover soil is estimated at 44,250 tons (29,500 cubic yards). The estimated quantity of soil/fill expected to be reused/relocated, if any, on Site is unknown at this time. The estimated quantity of concrete to be removed is 3,800 tons (1,900 cubic yards).

5.4 SOIL MANAGEMENT PLAN

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by an environmental professional or experienced field geologist under the direction of a Qualified Environmental Professional and/or the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC. Screening will also be performed on material imported to the Site.

All primary contaminant sources identified during the Site characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

5.4.2 Stockpile Methods

Soil will be stockpiled on lined hardened surfaces and any drainage collected by a berm for subsequent disposal. Stockpiled soil will be covered with plastic sheeting at the end of each day. Hay bales or other means may be used to control runoff, if warranted.

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

Stockpiles will be kept covered at all times with appropriately anchored tarps when not active. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences if warranted by Site conditions. Hay bales will be used as needed near catch basins, and other discharge points, where warranted.

A water supply will be available on-Site for dust control; hydrants and hoses of sufficient length and size will be used to control dust.

5.4.3 Materials Excavation and Load Out

The Remedial Engineer or environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material. The Volunteer and its contractors are responsible for safe execution of all invasive and other work performed under this RAWP.

Utilities and easements on Site will have been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

The following procedures will be implemented for all excavated soil to be transported off-Site:

a. All soils excavated from the Site will be categorized as urban fill soil or petroleum and/or solvent-contaminated soil.

    a. Urban fill soils that meet the RRSCOs will be reused on Site; otherwise, these soils will be loaded in trucks equipped with gasketed rear gates and impermeable roll tarps to prevent discharge during transit. No mesh tarps will be used in transporting urban fill soil. If the soils are dry, they will be wetted prior to covering to prevent dust generation during transport.

    b. Petroleum/solvent contaminated soil will be loaded on trucks equipped with gasketed rear gates and a tight-fitting impermeable tarp to prevent discharge during transit. No mesh tarps will be used in transporting creosote or petroleum contaminated soil.

    c. Soils without odors may be transported without tight-fitting covers according to the approved procedures (Appendix D).

b. All soils will be screened prior to leaving the Site for odor and moisture and the following procedures will be implemented.

    a. All odorous soils will be loaded in trucks equipped with gasketed rear gates and a tight-fitting impermeable tarp to prevent discharge during transit.

    b. If urban fill soils are lacking moisture and could potentially discharge dust during transit, the soil will be sprayed with water and loaded in trucks equipped with gasketed rear gates and impermeable roll tarps.

Loaded vehicles leaving the Site will be manifested and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on Site. A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and treated before disposal to the sanitary sewer or transported to a disposal facility. The Remedial Engineer will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the NYSDEC, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

Each hotspot and structure to be remediated (Dry Wells, USTs and associated piping, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during the Site characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the FER.

5.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded (refer to Section 4.2.6, Traffic Control). All material for disposal will be taken to licensed, regulated facilities. The NYSDEC project manager will be notified ahead of time of the disposal facilities.

5.4.5 Materials Disposal Off-Site

The soil disposal locations will be determined as the beginning of the remedial phase begins. Any disposal locations established at a later date will be reported to the NYSDEC project manager.

The total quantity of material expected to be disposed off-Site is approximately 2,600 tons of soil (1,735 cubic yards), all of it non-hazardous material, and approximately 3,800 tons (1,900 cubic) yards of concrete. A Contained-in Determination will be sought for solvent-impacted soils prior to disposal.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's project manager. Unregulated off-Site management of materials from the Site is prohibited without formal NYSDEC approval.

Material that does not meet URSCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that the material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit

modifications only upon prior notification of NYSDEC Region 1 DMM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

A waste manifest system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-Site (not anticipated) will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from the Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Reuse of soils on-Site is not planned. Nonetheless, soil reuse may become advantageous and be considered. If soil reuse is desired, then the soil in question will be segregated in situ or stockpiled and sampled according to the imported backfill requirements listed in the Soil Management Plan in Appendix D. Soils will be required to meet the SCOs for the Site or be approved by NYSDEC before being acceptable for reuse.

The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Concrete crushing or processing on-Site is prohibited.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final SMP.

5.4.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids (not planned), will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations.

5.4.8 Demarcation

Delineation of potential remaining contamination will be implemented by use of a demarcation layer consisting of geosynthetic fencing or equivalent material placed above residual soil to provide an observable reference layer.

5.4.9 Backfill from Off-Site Sources

Backfill from off-site source must meet the criteria and conditions listed in the Soil Management Plan in Appendix D.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site. All imported materials will be pre-approved by the Department.

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

The FER will include the following certification by the Remedial Engineer: “I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.”

Solid waste will not be imported onto the Site.

Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose. Solid waste will not be imported onto the Site.

5.4.10 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check dams functional. Silt fencing or hay bales may be installed around the entire perimeter of the remedial construction area if dropping the perimeter elevation six inches is insufficient to control runoff. See Appendix G.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. No stormwater run-off is anticipated from the Site

5.4.11 Contingency Plan

If previously unidentified contaminant sources are found during remedial excavation, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL VOCs and SVOCs, TCL pesticides and PCBs). These analyses will not be limited to Spill Technology and Remediation Series (STARS) parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's project manager. These findings will be also included in daily and periodic electronic media reports.

5.4.12 Community Air Monitoring Plan

The CAMP for the RAWP will be followed (Appendix H).

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH project managers within 24 hours and included in the Weekly Report.

5.4.13 Odor, Dust and Nuisance Control Plan

The FER will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include odor control foam and spray and covering soils. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Volunteer's Remedial Engineer, who is responsible for certifying the FER.

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

5.4.13.2 Dust Control Plan

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

- Dust suppression will be achieved through the use of hydrants and hoses for road wetting. The hoses shall be of sufficient length to reach all portions of the site. Water will be available on-site at suitable supply and pressure for use in dust control.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

If the Restricted Residential Track 4 Restricted Residential remedy cannot be attained, a Commercial Use Track 4 remedy will be the fallback. Long-term management of EC/ICs and of residual contamination will be executed under a site specific SMP that will be developed and included in the FER.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of RRSCOs on the Site. A survey of the Track areas achieved in the Site will be provided in the FER. The elevation of all end point samples will be presented on a map in the SMP showing where residual contaminated soils are located (if any).

7.0 ENGINEERING CONTROLS

Exposure to residual contaminated soils will be prevented by a two-foot-thick soil cap over the entire Site. The cap will be comprised of two feet of clean, imported, approved material. A visual barrier will also be added two feet below the top of the cap in non-building areas.

A passive SSDS will also be installed beneath the proposed building slab and be constructed per NYSDEC requirements, but will be constructed such that the SSDS may be modified to an active SSDS, if required. The SSDS will mitigate the potential for vapor intrusion from on-site as well as potential off-site sources. As a component of the SSDS, a vapor barrier will be installed below the proposed building slab and installed per the manufacturer's specifications. A SSDS design will be prepared following building design completions and submitted to the Department for review and approval prior to installation. Post-construction indoor air sampling will be conducted to assess whether a SVI is warranted and whether the SSDS should be activated based on the results of the SVI.

A SoMP will be included in the SMP and will outline the procedures to be followed in the event that the two-foot-thick soil cap and underlying residual contamination are disturbed after the Remedial Action is complete.

Maintenance of this soil cap will be described in the SMP and in the FER.

8.0 INSTITUTIONAL CONTROLS

The Site will have residual contamination remaining in place after the remedy. ICs that ensure long term management of the remaining contamination must be incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two methods of control have been designed to ensure continual and proper management of remaining contamination in perpetuity: an Environmental Easement that prohibits the use of groundwater and restricts Site uses, and the SMP.

8.1 Environmental Easement

A Site-specific Environmental Easement will be recorded with the Nassau County Clerk's Office to provide an enforceable means of ensuring the continual and proper management of remaining contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all ECs and ICs placed on the Site by this NYSDEC-approved remedy. ICs provide restrictions on site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and the grantor's successors and assigns.

The ICs that support ECs are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and assigns and adherence of all elements of the SMP is required;
- All ECs must be operated and maintained as specified in the SMP;
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- ECs may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Controlled Property (the Site) will also have a series of ICs in the form of site restrictions and requirements. The site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;

- All future activities on the Controlled Property that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;

- The Controlled Property may be used for restricted residential, commercial and industrial use only, provided the long-term ECs and ICs included in the SMP are employed;

- The Controlled Property may not be used for a higher level of use, such as unrestricted use without an amendment or extinguishment of this Environmental Easement;

- Access to the Site must be provided to agents, employees or other representatives of the NYSDEC with reasonable prior notice to the property owner to assure compliance with the restrictions identified in the Environmental Easement;

- Any future buildings constructed onsite will be fitted with vapor barriers and indoor air samples collected and, if necessary, an evaluation for soil vapor intrusion will be conducted prior to occupancy;

- The NYSDEC will be notified if the Site has a change of use, is sold, or is subdivided, and;

- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

8.2 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the COC for the Remedial Action. The SMP is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Periodic Review Reports, performance of inspections and certification of results, and demonstration of proper communication of the Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an ECs and ICs Control Plan for implementation and management of ECs and ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems, if any; and (4) a Periodic Review Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The SMP will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

9.0 FINAL ENGINEERING REPORT

A FER will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this RAWP. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests and bills of lading. The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents, if any. The FER will be prepared in conformance with DER-10.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all endpoint samples that show adherence to the Track 4 cleanup using the RRSCOs in 6NYCRR Part 375-6 or, in the case where Track 4 cleanup using the RRSCOs is not achieved, a Track 4 cleanup using the CUSCOs will be used. The FER will document where endpoint samples did not achieve the remedial goal.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a COC, all project reports must be submitted in digital form on electronic media (PDF).

9.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the Remedial Engineer, Arnold F. Fleming, P.E., who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

> I, Arnold F. Fleming, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 175 Roger Avenue Commercial Development, Site (NYSDEC Brownfield Site Cleanup Agreement Index No. C130164-07-19, Site No. C130164).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement [not anticipated], the Site Management Plan [contingency only], and the Brownfield Cleanup Agreement for [Site name] and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

[If required] I certify that all use restrictions, ICs, ECs, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the BCP Volunteer for the continual and proper operation, maintenance, and monitoring of all ECs employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

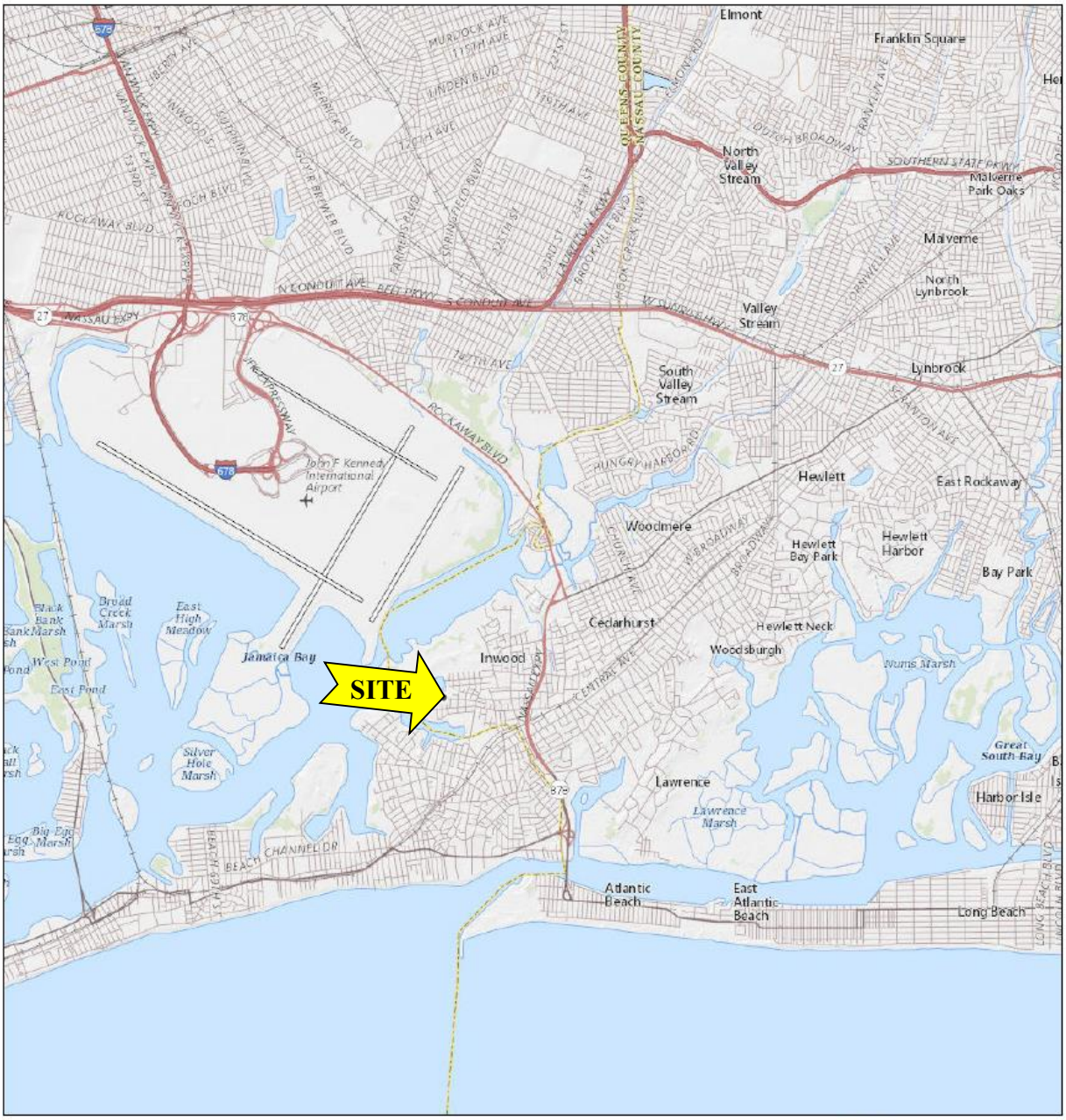
I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

Figures



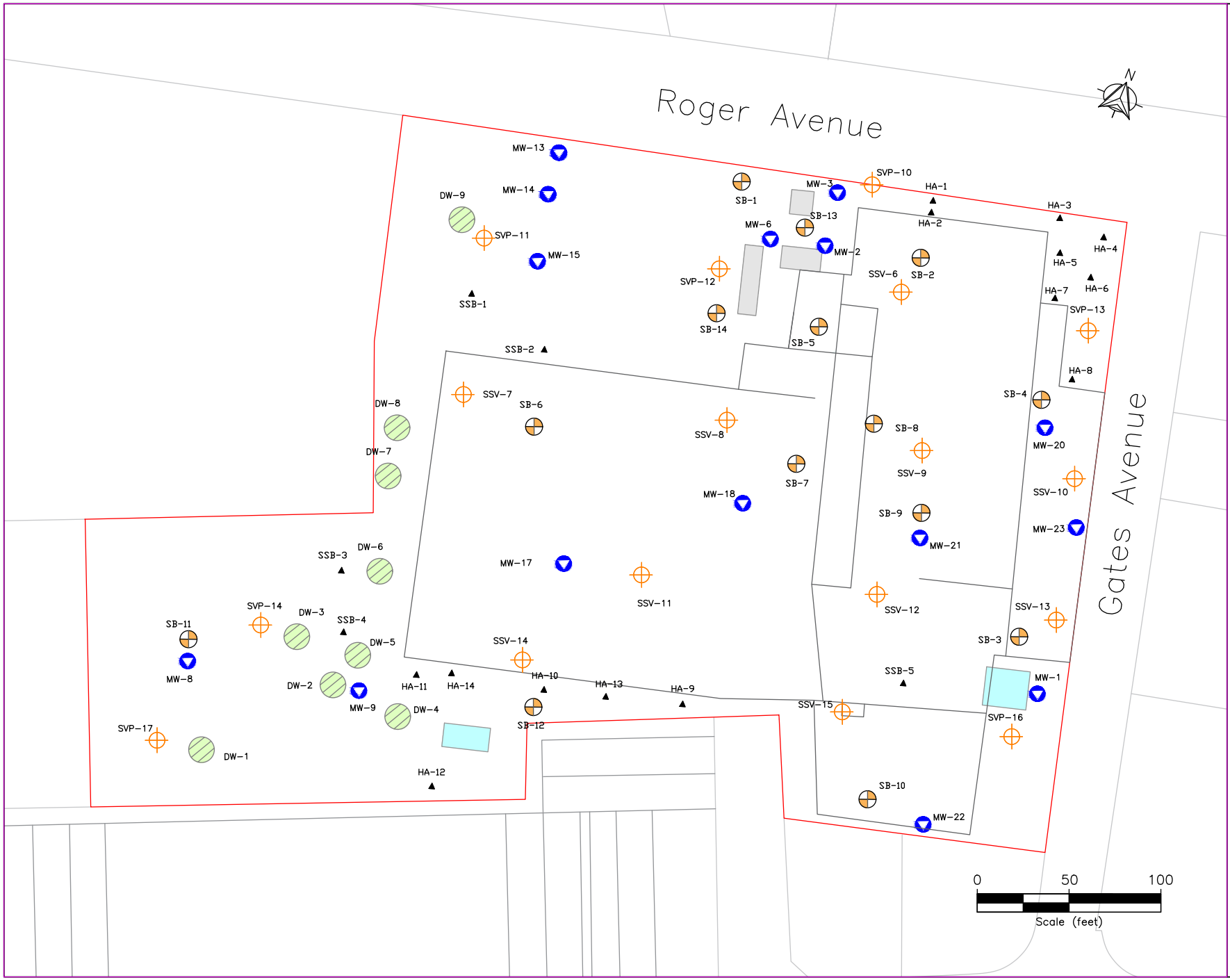
Quadrant 7.5 Minute Topographic Map, published by the USGS, and obtained from National Map Viewer ©2018

Fleming Lee Shue

FIGURE 1: SITE LOCATION MAP

SITE: 175 Rogers Ave
Inwood, NY, 11096

CLIENT: AJM Capital



FILE: /Users/shall/Desktop/Jordan/Figure 2 - Site Plan.dwg DATE: 8/28/2020

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Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY 11096
BCP No. 130164

Figure 2

Site Plan

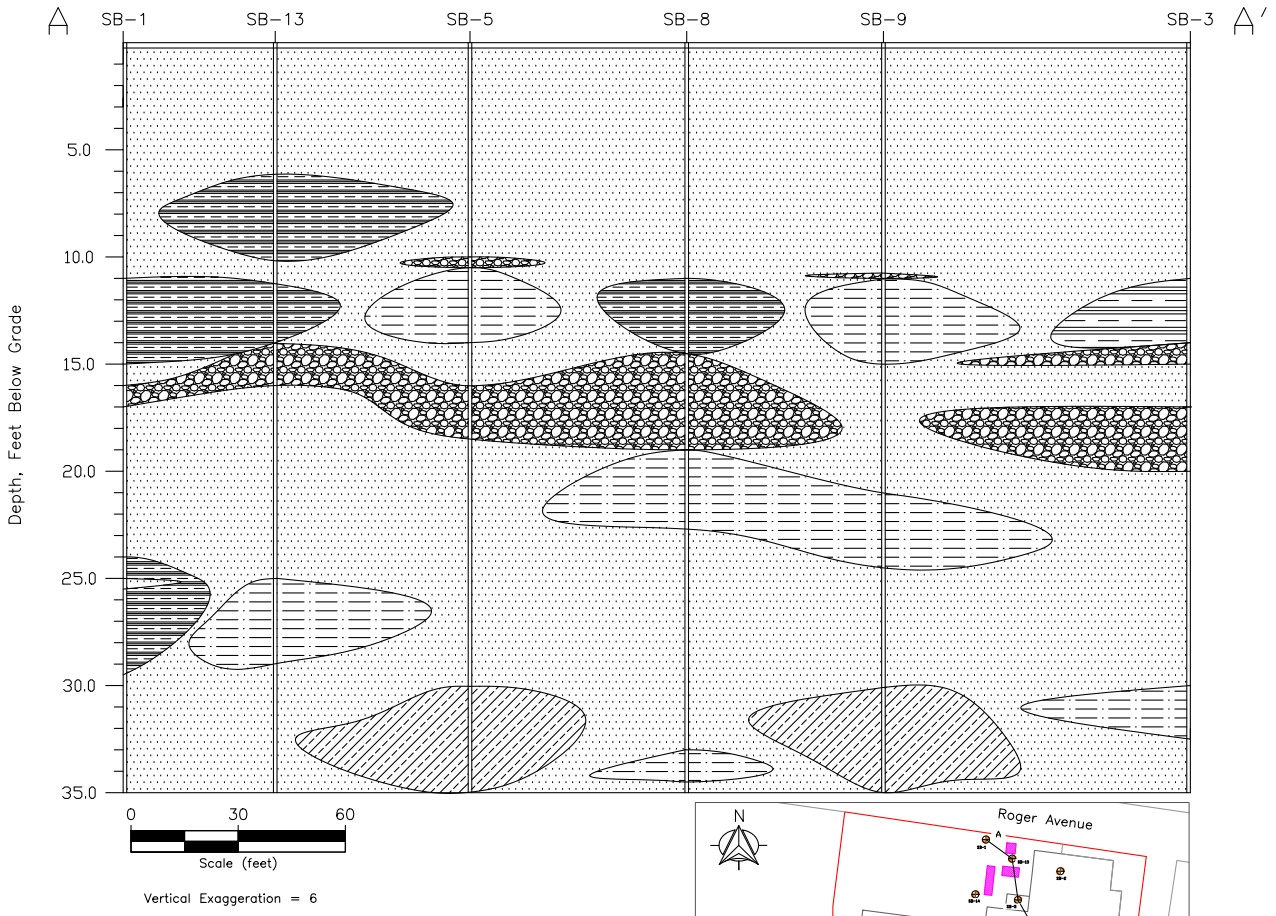
September 2020

Project Number
10188-017

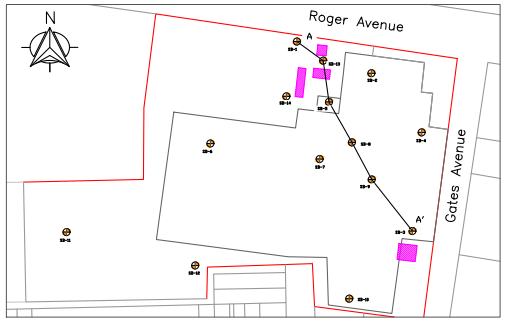
LEGEND

- Former Warehouse Building and Room Outlines
- BCP Boundary
- Underground Storage Tank (UST)
- Potential UST
- Dry Well
- Existing Monitoring Well
- Soil Vapor Sample Location
- Soil Boring Sample Location
- Shallow Soil Sample Location

Notes:
Temporary groundwater samples collected from Soil Borings, except SB-11



Notes:
Data collected from 5/20/2020 – 5/29/2020.
Where data and soil descriptions are missing, geology is inferred.



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Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, N, 11096
BCP No. C130164

Figure 3A

Remedial Investigation Soil Cross-section A-A'

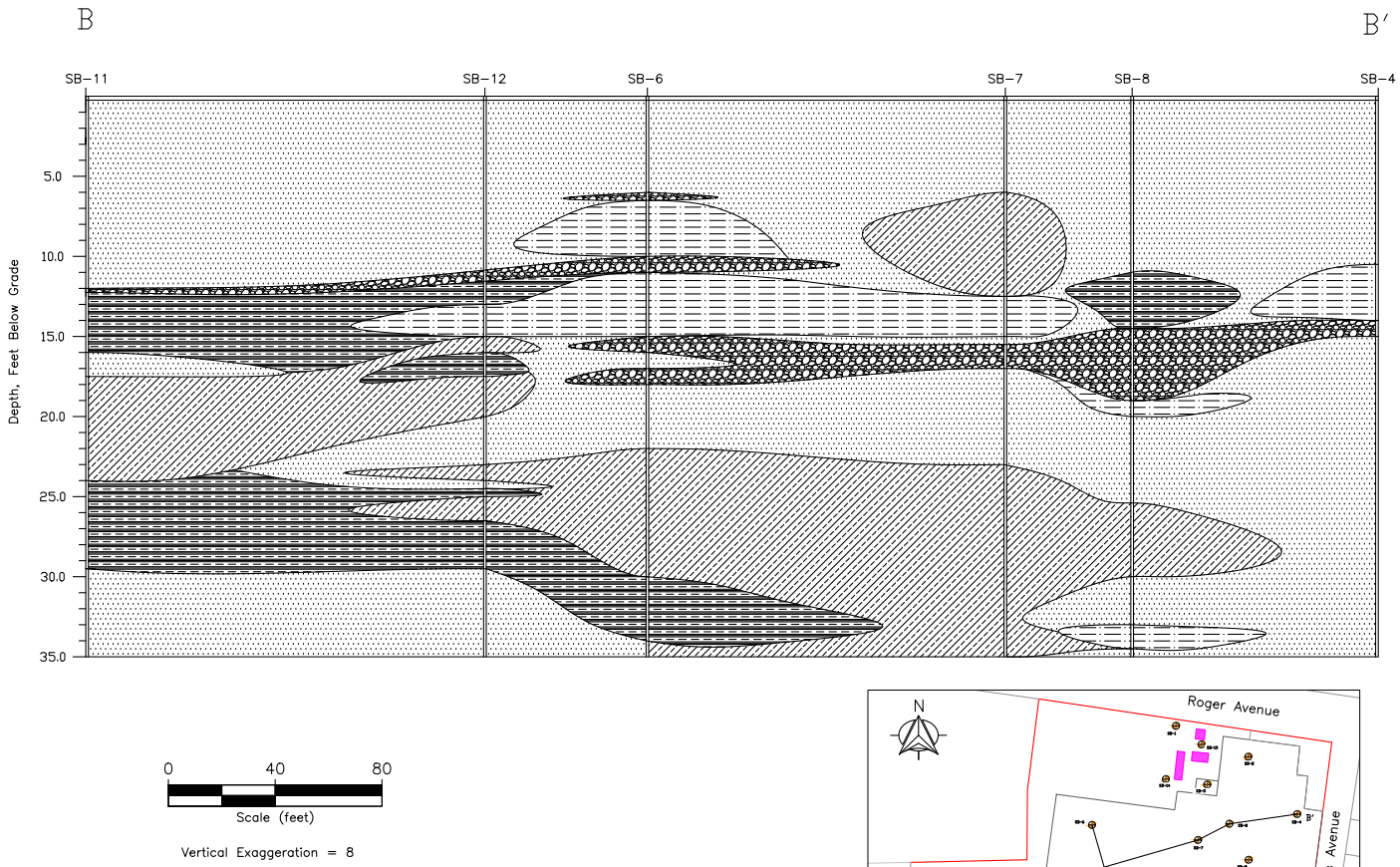
June 2020

Project Number
10188-017

LEGEND

- Concrete
- Gravels
- Sand
- Silt
- Clay
- Clayey/Silty Sand

FILE: /Users/shall/Desktop/Jordan/Figure X Cross Section_job-b'.dwg DATE: 7/22/2020

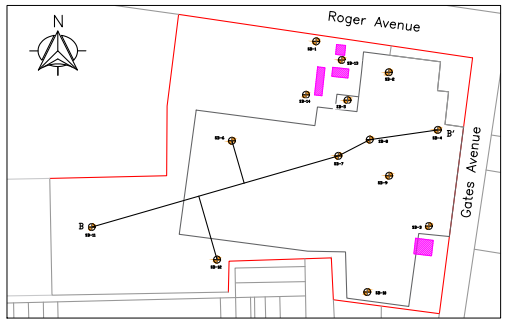


0 40 80

Scale (feet)

Vertical Exaggeration = 8

Notes:
Data collected from 5/20/2020 – 5/29/2020.
Where data and soil descriptions are missing, geology is inferred.



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Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

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Figure 3B

Remedial Investigation Soil Cross-section B-B'

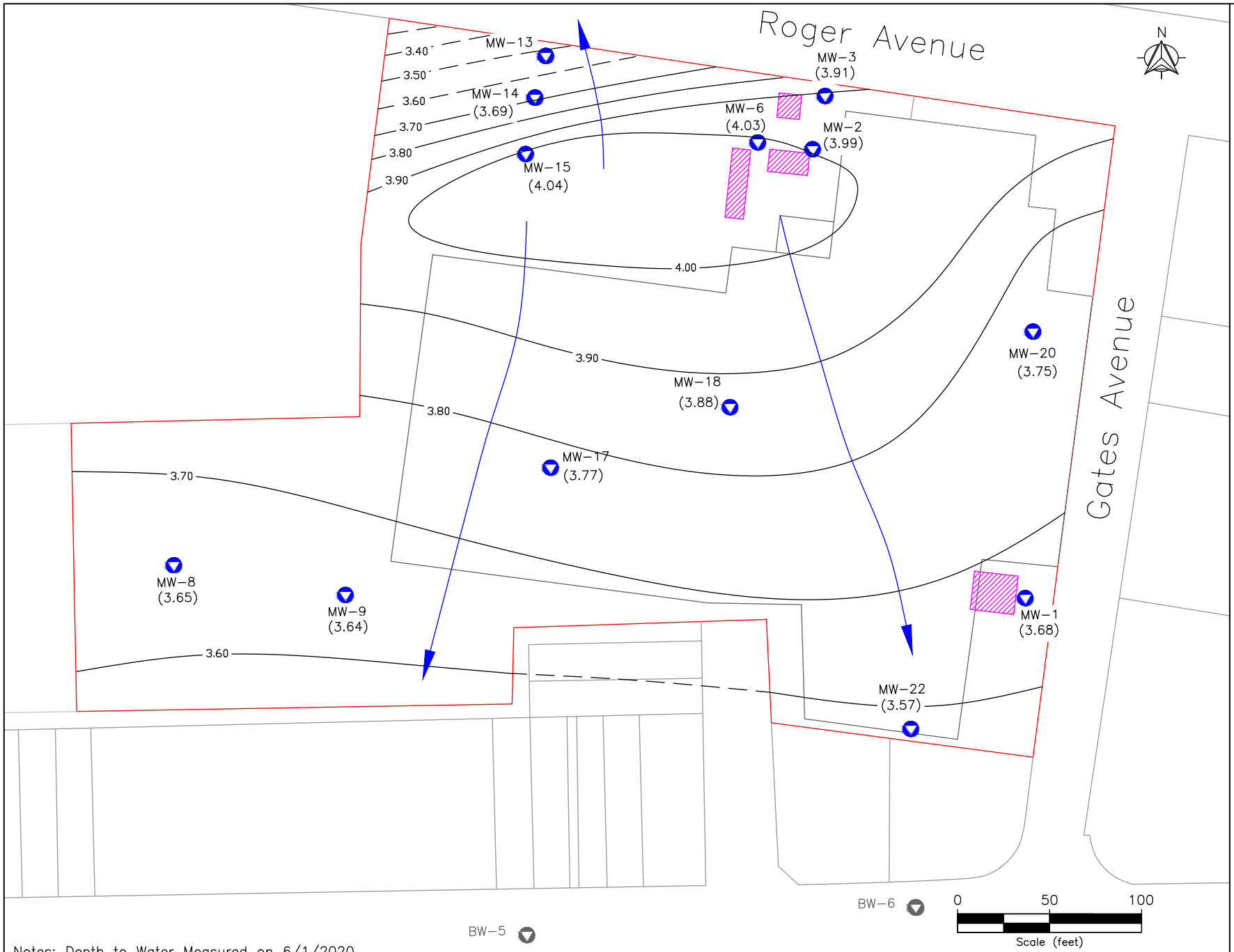
June 2020

Project Number
10188-017

LEGEND

- Concrete
- Gravels
- Sand
- Silt
- Clay
- Clayey/Silty Sand

FILE: /Users/shall/Desktop/Jordan/Figure X Cross Section_job-b'.dwg DATE: 7/22/2020



Notes: Depth to Water Measured on 6/1/2020
Source: Fehringer Surveying, P.C. 6/1/2020

FILE: /Users/shall/Desktop/Jordan/Figure X Groundwater Contour_ja.dwg DATE: 7/22/2020

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158 West 29th Street, 9th Fl.
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Figure 4

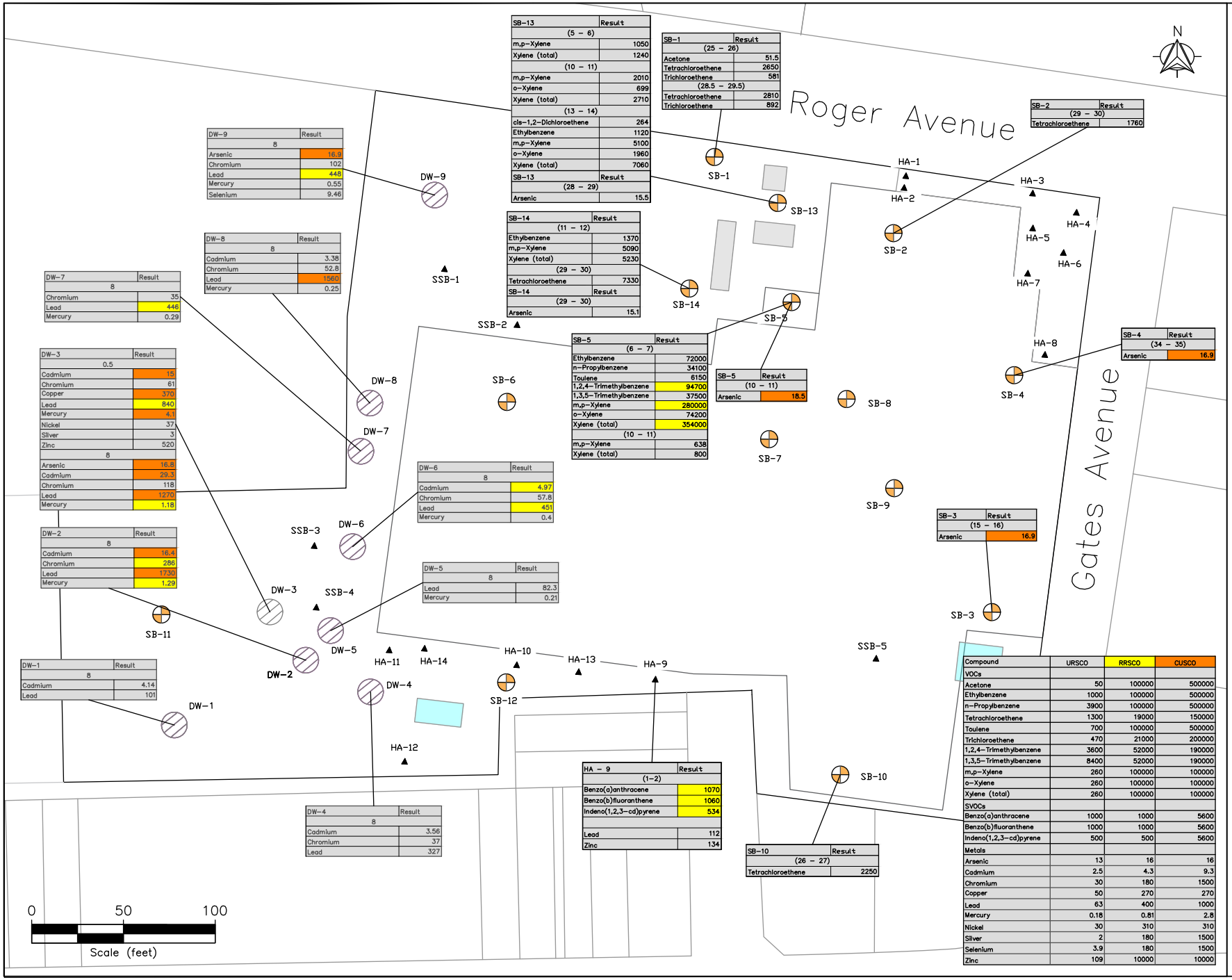
Groundwater Flow Direction

July 2020

Project Number
10188-017

LEGEND

- Former Warehouse Building Outline
- BCP Boundary
- Geophysical Anomalies
- Existing Monitoring Well and GW Elevation (18')
- Groundwater Contour (dashed where inferred)
- Groundwater Flow Direction



SB-13	Result
(5 – 6)	
m,p-Xylene	1050
Xylene (total)	1240
(10 – 11)	
m,p-Xylene	2010
o-Xylene	699
Xylene (total)	2710
(13 – 14)	
cis-1,2-Dichloroethene	264
Ethylbenzene	1120
m,p-Xylene	5100
o-Xylene	1960
Xylene (total)	7060
SB-13	Result
(28 – 29)	
Arsenic	15.5

SB-1	Result
(25 – 26)	
Acetone	51.5
Tetrachloroethene	2650
Trichloroethene	581
(28.5 – 29.5)	
Tetrachloroethene	2810
Trichloroethene	892

SB-2	Result
(29 – 30)	
Tetrachloroethene	1760

DW-9	Result
8	
Arsenic	16.9
Chromium	102
Lead	448
Mercury	0.55
Selenium	9.46

SB-14	Result
(11 – 12)	
Ethylbenzene	1370
m,p-Xylene	5090
Xylene (total)	5230
(29 – 30)	
Tetrachloroethene	7330
SB-14	Result
(29 – 30)	
Arsenic	15.1

DW-8	Result
8	
Cadmium	3.38
Chromium	52.8
Lead	1560
Mercury	0.25

DW-7	Result
8	
Chromium	35
Lead	446
Mercury	0.29

SB-5	Result
(6 – 7)	
Ethylbenzene	72000
n-Propylbenzene	34100
Toulene	6150
1,2,4-Trimethylbenzene	94700
1,3,5-Trimethylbenzene	37500
m,p-Xylene	280000
o-Xylene	74200
Xylene (total)	354000
(10 – 11)	
m,p-Xylene	638
Xylene (total)	800

SB-5	Result
(10 – 11)	
Arsenic	18.5

SB-4	Result
(34 – 35)	
Arsenic	16.9

DW-3	Result
0.5	
Cadmium	15
Chromium	61
Copper	370
Lead	840
Mercury	4.1
Nickel	37
Silver	3
Zinc	520
8	
Arsenic	16.8
Cadmium	29.3
Chromium	118
Lead	1270
Mercury	1.18

DW-6	Result
8	
Cadmium	4.97
Chromium	57.8
Lead	451
Mercury	0.4

SB-3	Result
(15 – 16)	
Arsenic	16.9

DW-2	Result
8	
Cadmium	16.4
Chromium	286
Lead	1730
Mercury	1.29

DW-5	Result
8	
Lead	82.3
Mercury	0.21

DW-1	Result
8	
Cadmium	4.14
Lead	101

HA – 9	Result
(1–2)	
Benzo(a)anthracene	1070
Benzo(b)fluoranthene	1060
Indeno(1,2,3-cd)pyrene	534
Lead	112
Zinc	134

DW-4	Result
8	
Cadmium	3.56
Chromium	37
Lead	327

SB-10	Result
(26 – 27)	
Tetrachloroethene	2250

Compound	URSCO	RRSCO	CUSCO
VOCs			
Acetone	50	100000	500000
Ethylbenzene	1000	100000	500000
n-Propylbenzene	3900	100000	500000
Tetrachloroethene	1300	19000	150000
Toulene	700	100000	500000
Trichloroethene	470	21000	200000
1,2,4-Trimethylbenzene	3600	52000	190000
1,3,5-Trimethylbenzene	8400	52000	190000
m,p-Xylene	260	100000	100000
o-Xylene	260	100000	100000
Xylene (total)	260	100000	100000
SVOCs			
Benzo(a)anthracene	1000	1000	5600
Benzo(b)fluoranthene	1000	1000	5600
Indeno(1,2,3-cd)pyrene	500	500	5600
Metals			
Arsenic	13	16	16
Cadmium	2.5	4.3	9.3
Chromium	30	180	1500
Copper	50	270	270
Lead	63	400	1000
Mercury	0.18	0.81	2.8
Nickel	30	310	310
Silver	2	180	1500
Selenium	3.9	180	1500
Zinc	109	10000	10000

Fleming Lee Shue

Environmental Management & Consulting

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New York, NY 10001

175 Roger Avenue
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BCP No. 130164

Figure 5

Soil Results Above Soil Cleanup Objectives

July 2020

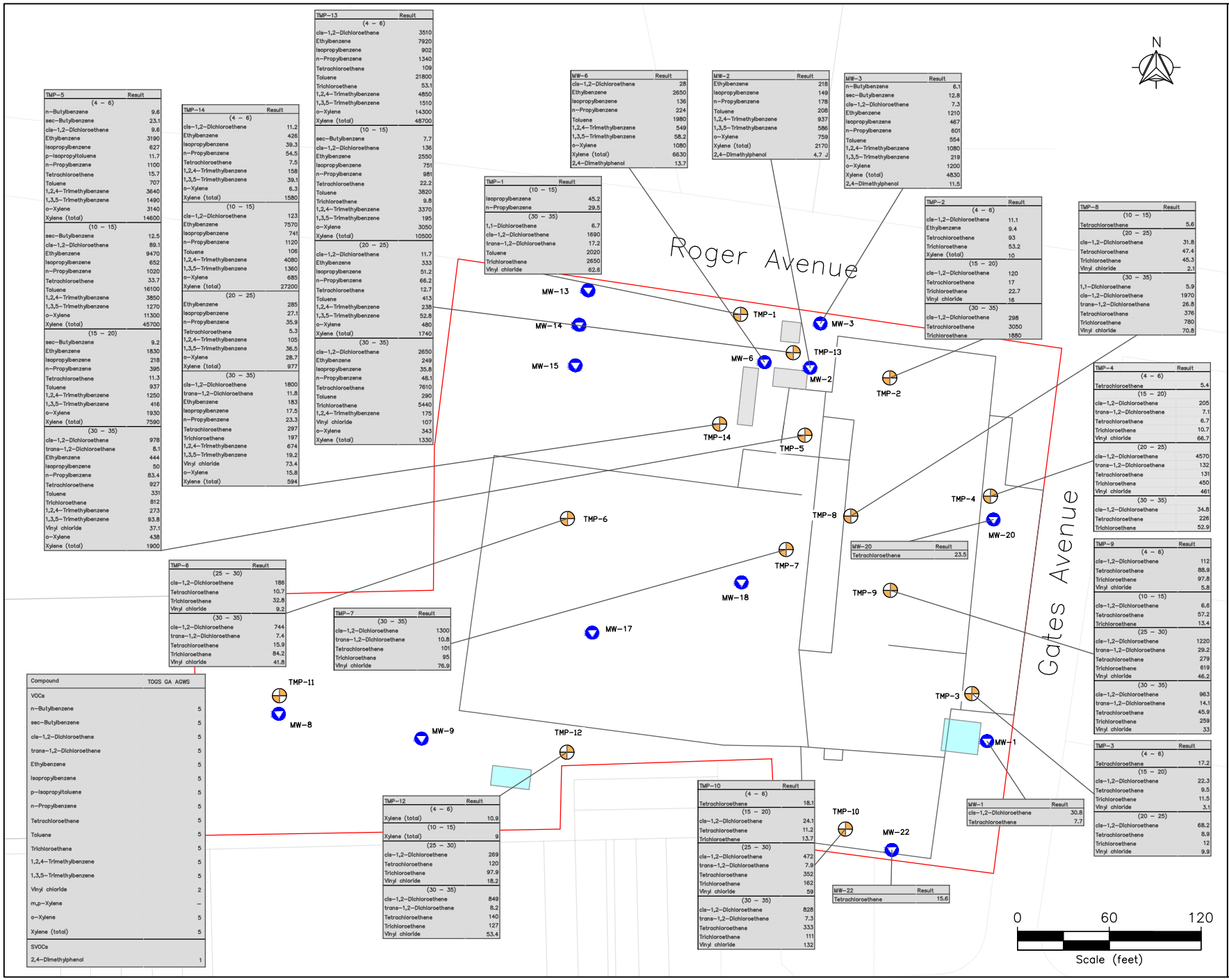
Project Number
10188-017

LEGEND

- Former Warehouse Building Outline
- BCP Boundary
- Soil Boring Location
- Shallow Soil Sample Location
- Drywell Sample Location
- Underground Storage Tank (UST)
- Potential UST

Notes:
Samples collected 5/21/20 – 5/29/20
VOC and SVOC data are reported in ug/kg
Metals data are reported in mg/kg
All sample depths are reported in feet below grade
URSCOs – Unrestricted Use Soil Cleanup Objectives
RRSCOs – Restricted Residential Soil Cleanup Objectives (Yellow)
CUSCOs – Commercial Use Soil Cleanup Objectives (Orange)
Drywell data taken from ATC 2009 RIR

FILE: /Users/shall/Desktop/Jordan/5 Soil Exceedance.dwg DATE: 9/25/2020



TMP-5	Result
(4 – 6)	
n-Butylbenzene	9.6
sec-Butylbenzene	23.1
cis-1,2-Dichloroethene	9.6
Ethylbenzene	3190
Isopropylbenzene	627
p-Isopropyltoluene	11.7
n-Propylbenzene	1100
Tetrachloroethene	15.7
Toluene	707
1,2,4-Trimethylbenzene	3640
1,3,5-Trimethylbenzene	1490
o-Xylene	3140
Xylene (total)	14600
(10 – 15)	
sec-Butylbenzene	12.5
cis-1,2-Dichloroethene	89.1
Ethylbenzene	9470
Isopropylbenzene	652
n-Propylbenzene	1020
Tetrachloroethene	33.7
Toluene	16100
1,2,4-Trimethylbenzene	3850
1,3,5-Trimethylbenzene	1270
o-Xylene	11300
Xylene (total)	45700
(15 – 20)	
sec-Butylbenzene	9.2
Ethylbenzene	1830
Isopropylbenzene	218
n-Propylbenzene	395
Tetrachloroethene	11.3
Toluene	937
1,2,4-Trimethylbenzene	1250
1,3,5-Trimethylbenzene	416
o-Xylene	1930
Xylene (total)	7590
(30 – 35)	
cis-1,2-Dichloroethene	978
trans-1,2-Dichloroethene	8.1
Ethylbenzene	444
Isopropylbenzene	50
n-Propylbenzene	83.4
Tetrachloroethene	927
Toluene	331
Trichloroethene	812
1,2,4-Trimethylbenzene	273
1,3,5-Trimethylbenzene	93.8
Vinyl chloride	37.1
o-Xylene	438
Xylene (total)	1900

TMP-14	Result
(4 – 6)	
cis-1,2-Dichloroethene	11.2
Ethylbenzene	426
Isopropylbenzene	39.3
n-Propylbenzene	54.5
Tetrachloroethene	7.5
1,2,4-Trimethylbenzene	158
1,3,5-Trimethylbenzene	39.1
o-Xylene	6.3
Xylene (total)	1580
(10 – 15)	
cis-1,2-Dichloroethene	123
Ethylbenzene	7570
Isopropylbenzene	741
n-Propylbenzene	1120
Toluene	106
1,2,4-Trimethylbenzene	4080
1,3,5-Trimethylbenzene	1360
o-Xylene	685
Xylene (total)	27200
(20 – 25)	
Ethylbenzene	285
Isopropylbenzene	27.1
n-Propylbenzene	35.9
Tetrachloroethene	5.3
1,2,4-Trimethylbenzene	105
1,3,5-Trimethylbenzene	36.5
o-Xylene	28.7
Xylene (total)	977
(30 – 35)	
cis-1,2-Dichloroethene	1800
trans-1,2-Dichloroethene	11.8
Ethylbenzene	183
Isopropylbenzene	17.5
n-Propylbenzene	23.3
Tetrachloroethene	297
Trichloroethene	197
1,2,4-Trimethylbenzene	674
1,3,5-Trimethylbenzene	19.2
Vinyl chloride	73.4
o-Xylene	15.8
Xylene (total)	594

TMP-13	Result
(4 – 6)	
cis-1,2-Dichloroethene	3510
Ethylbenzene	7920
Isopropylbenzene	902
n-Propylbenzene	1340
Tetrachloroethene	109
Toluene	21800
Trichloroethene	53.1
1,2,4-Trimethylbenzene	4850
1,3,5-Trimethylbenzene	1510
o-Xylene	14300
Xylene (total)	48700
(10 – 15)	
sec-Butylbenzene	7.7
cis-1,2-Dichloroethene	136
Ethylbenzene	2550
Isopropylbenzene	751
n-Propylbenzene	981
Tetrachloroethene	22.2
Toluene	3820
Trichloroethene	9.8
1,2,4-Trimethylbenzene	3370
1,3,5-Trimethylbenzene	195
o-Xylene	3050
Xylene (total)	10500
(20 – 25)	
cis-1,2-Dichloroethene	11.7
Ethylbenzene	333
Isopropylbenzene	51.2
n-Propylbenzene	66.2
Tetrachloroethene	12.7
Toluene	413
1,2,4-Trimethylbenzene	238
1,3,5-Trimethylbenzene	52.8
o-Xylene	480
Xylene (total)	1740
(30 – 35)	
cis-1,2-Dichloroethene	2650
Ethylbenzene	249
Isopropylbenzene	35.8
n-Propylbenzene	48.1
Tetrachloroethene	7610
Toluene	290
Trichloroethene	5440
1,2,4-Trimethylbenzene	175
Vinyl chloride	107
o-Xylene	343
Xylene (total)	1330

MW-6	Result
cis-1,2-Dichloroethene	28
Ethylbenzene	2650
Isopropylbenzene	136
n-Propylbenzene	224
Toluene	1980
1,2,4-Trimethylbenzene	549
1,3,5-Trimethylbenzene	58.2
o-Xylene	1080
Xylene (total)	6630
2,4-Dimethylphenol	13.7

MW-2	Result
Ethylbenzene	218
Isopropylbenzene	149
n-Propylbenzene	178
Toluene	208
1,2,4-Trimethylbenzene	937
1,3,5-Trimethylbenzene	586
o-Xylene	759
Xylene (total)	2170
2,4-Dimethylphenol	4.7 J

MW-3	Result
n-Butylbenzene	6.1
sec-Butylbenzene	12.8
cis-1,2-Dichloroethene	7.3
Ethylbenzene	1210
Isopropylbenzene	467
n-Propylbenzene	601
Toluene	554
1,2,4-Trimethylbenzene	1080
1,3,5-Trimethylbenzene	219
o-Xylene	1200
Xylene (total)	4830
2,4-Dimethylphenol	11.5

TMP-1	Result
(10 – 15)	
Isopropylbenzene	45.2
n-Propylbenzene	29.5
(30 – 35)	
1,1-Dichloroethene	6.7
cis-1,2-Dichloroethene	1690
trans-1,2-Dichloroethene	17.2
Toluene	2020
Trichloroethene	2650
Vinyl chloride	62.6

TMP-2	Result
(4 – 6)	
cis-1,2-Dichloroethene	11.1
Ethylbenzene	9.4
Tetrachloroethene	93
Trichloroethene	53.2
Xylene (total)	10
(15 – 20)	
cis-1,2-Dichloroethene	120
Tetrachloroethene	17
Trichloroethene	22.7
Vinyl chloride	16
(30 – 35)	
cis-1,2-Dichloroethene	298
Tetrachloroethene	3050
Trichloroethene	1880

TMP-8	Result
(10 – 15)	
Tetrachloroethene	5.6
(20 – 25)	
cis-1,2-Dichloroethene	31.8
Tetrachloroethene	47.4
Trichloroethene	45.3
Vinyl chloride	2.1
(30 – 35)	
1,1-Dichloroethene	5.9
cis-1,2-Dichloroethene	1970
trans-1,2-Dichloroethene	26.8
Tetrachloroethene	376
Trichloroethene	780
Vinyl chloride	70.8

TMP-4	Result
(4 – 6)	
Tetrachloroethene	5.4
(15 – 20)	
cis-1,2-Dichloroethene	205
trans-1,2-Dichloroethene	7.1
Tetrachloroethene	6.7
Trichloroethene	10.7
Vinyl chloride	66.7
(20 – 25)	
cis-1,2-Dichloroethene	4570
trans-1,2-Dichloroethene	132
Tetrachloroethene	131
Trichloroethene	450
Vinyl chloride	461
(30 – 35)	
cis-1,2-Dichloroethene	34.8
Tetrachloroethene	226
Trichloroethene	52.9

TMP-6	Result
(25 – 30)	
cis-1,2-Dichloroethene	186
Tetrachloroethene	10.7
Trichloroethene	32.8
Vinyl chloride	9.2
(30 – 35)	
cis-1,2-Dichloroethene	744
trans-1,2-Dichloroethene	7.4
Tetrachloroethene	15.9
Trichloroethene	84.2
Vinyl chloride	41.8

TMP-7	Result
(30 – 35)	
cis-1,2-Dichloroethene	1300
trans-1,2-Dichloroethene	10.8
Tetrachloroethene	101
Trichloroethene	95
Vinyl chloride	76.9

MW-20	Result
Tetrachloroethene	23.5

TMP-9	Result
(4 – 6)	
cis-1,2-Dichloroethene	112
Tetrachloroethene	88.9
Trichloroethene	97.8
Vinyl chloride	5.8
(10 – 15)	
cis-1,2-Dichloroethene	6.6
Tetrachloroethene	57.2
Trichloroethene	13.4
(25 – 30)	
cis-1,2-Dichloroethene	1220
trans-1,2-Dichloroethene	29.2
Tetrachloroethene	279
Trichloroethene	619
Vinyl chloride	46.2
(30 – 35)	
cis-1,2-Dichloroethene	963
trans-1,2-Dichloroethene	14.1
Tetrachloroethene	45.9
Trichloroethene	259
Vinyl chloride	33

TMP-3	Result
(4 – 6)	
Tetrachloroethene	17.2
(15 – 20)	
cis-1,2-Dichloroethene	22.3
Tetrachloroethene	9.5
Trichloroethene	11.5
Vinyl chloride	3.1
(20 – 25)	
cis-1,2-Dichloroethene	68.2
Tetrachloroethene	8.9
Trichloroethene	12
Vinyl chloride	9.9

TMP-12	Result
(4 – 6)	
Xylene (total)	10.9
(10 – 15)	
Xylene (total)	9
(25 – 30)	
cis-1,2-Dichloroethene	269
Tetrachloroethene	120
Trichloroethene	97.9
Vinyl chloride	18.2
(30 – 35)	
cis-1,2-Dichloroethene	849
trans-1,2-Dichloroethene	8.2
Tetrachloroethene	140
Trichloroethene	127
Vinyl chloride	53.4

TMP-10	Result
(4 – 6)	
Tetrachloroethene	18.1
(15 – 20)	
cis-1,2-Dichloroethene	24.1
Tetrachloroethene	11.2
Trichloroethene	13.7
(25 – 30)	
cis-1,2-Dichloroethene	472
trans-1,2-Dichloroethene	7.9
Tetrachloroethene	352
Trichloroethene	162
Vinyl chloride	59
(30 – 35)	
cis-1,2-Dichloroethene	828
trans-1,2-Dichloroethene	7.3
Tetrachloroethene	333
Trichloroethene	111
Vinyl chloride	132

MW-1	Result
cis-1,2-Dichloroethene	30.8
Tetrachloroethene	7.7

MW-22	Result
Tetrachloroethene	15.6

Compound	TOGS GA AGWS
VOCs	
n-Butylbenzene	5
sec-Butylbenzene	5
cis-1,2-Dichloroethene	5
trans-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
p-Isopropyltoluene	5
n-Propylbenzene	5
Tetrachloroethene	5
Toluene	5
Trichloroethene	5
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
Vinyl chloride	2
m,p-Xylene	–
o-Xylene	5
Xylene (total)	5
SVOCs	
2,4-Dimethylphenol	1

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY, 11096
BCP No. 130164

Figure 6

Groundwater Results (µg/L) above TOGS GA AWQS

July 2020

Project Number
10188-017

LEGEND

- Tax Lot Boundaries
- Former Warehouse Building and Room Outlines
- BCP Boundary
- Underground Storage Tank (UST)
- Potential UST
- Monitoring Well
- Temporary Monitoring Well

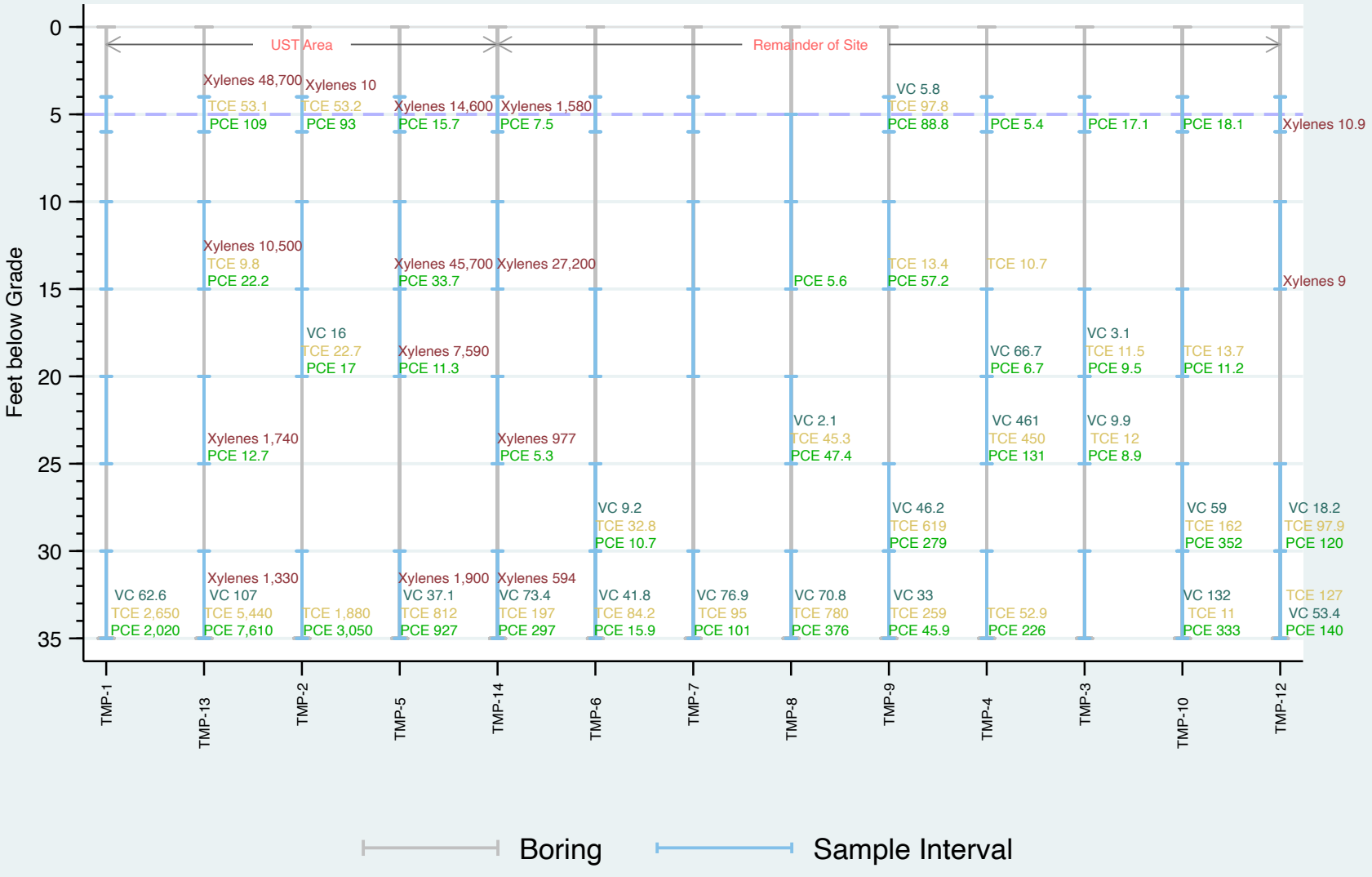
(30 – 35) Sample Interval, ft. below grade

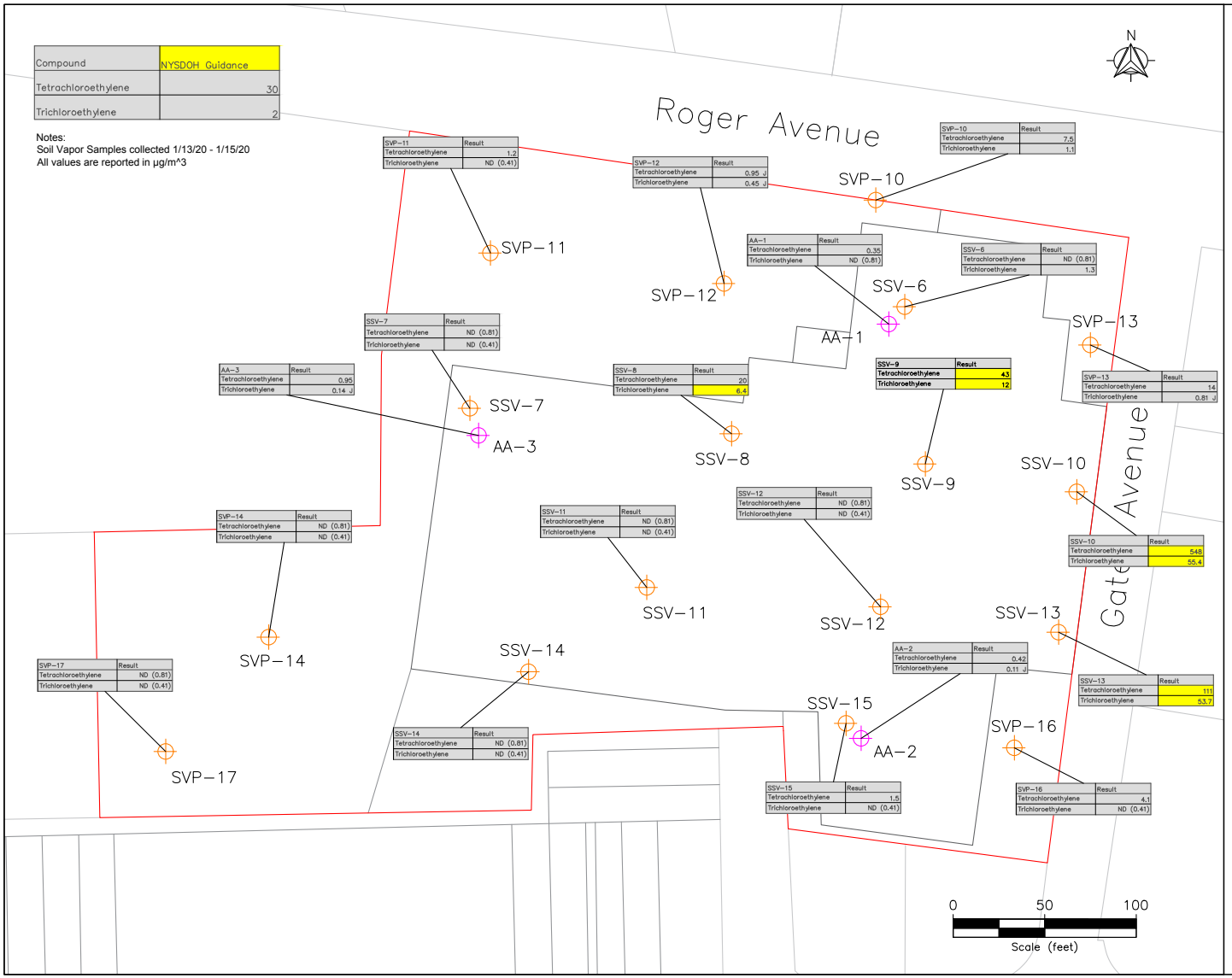
Notes:
All values are reported in µg/L
TOGS GA AWQS – Technical and Operational Guidance Series GA Ambient Water Quality Standards
All filtered metals belwo TOGS
Samples collected 1/9/20 – 1/10/20 and 5/21/20 – 5/29/20
Wells MW-8, MW-9, MW-13, MW-14, MW-15, MW-17 and MW-18 had no exceedances above TOGS GA AWQS
Where no specific TOGS criterion exists, the general guidance value was used.

FILE: /Users/shall/Desktop/Jordan/GW Exceedance.dwg DATE: 9/25/2020

Fig. 7 - Temp. Groundwater Sampling Intervals & Results above TOGS, µg/L

VOCs: PCE, TCE, Vinyl Chloride, & Xylenes





FILE: /Users/shall/Desktop/Jordan/soil vapor exceedance.dwg DATE: 7/29/2020

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY, 11096
BCP No. 130164

Figure 8

Soil Vapor PCE and TCE Results (µg/m^3)

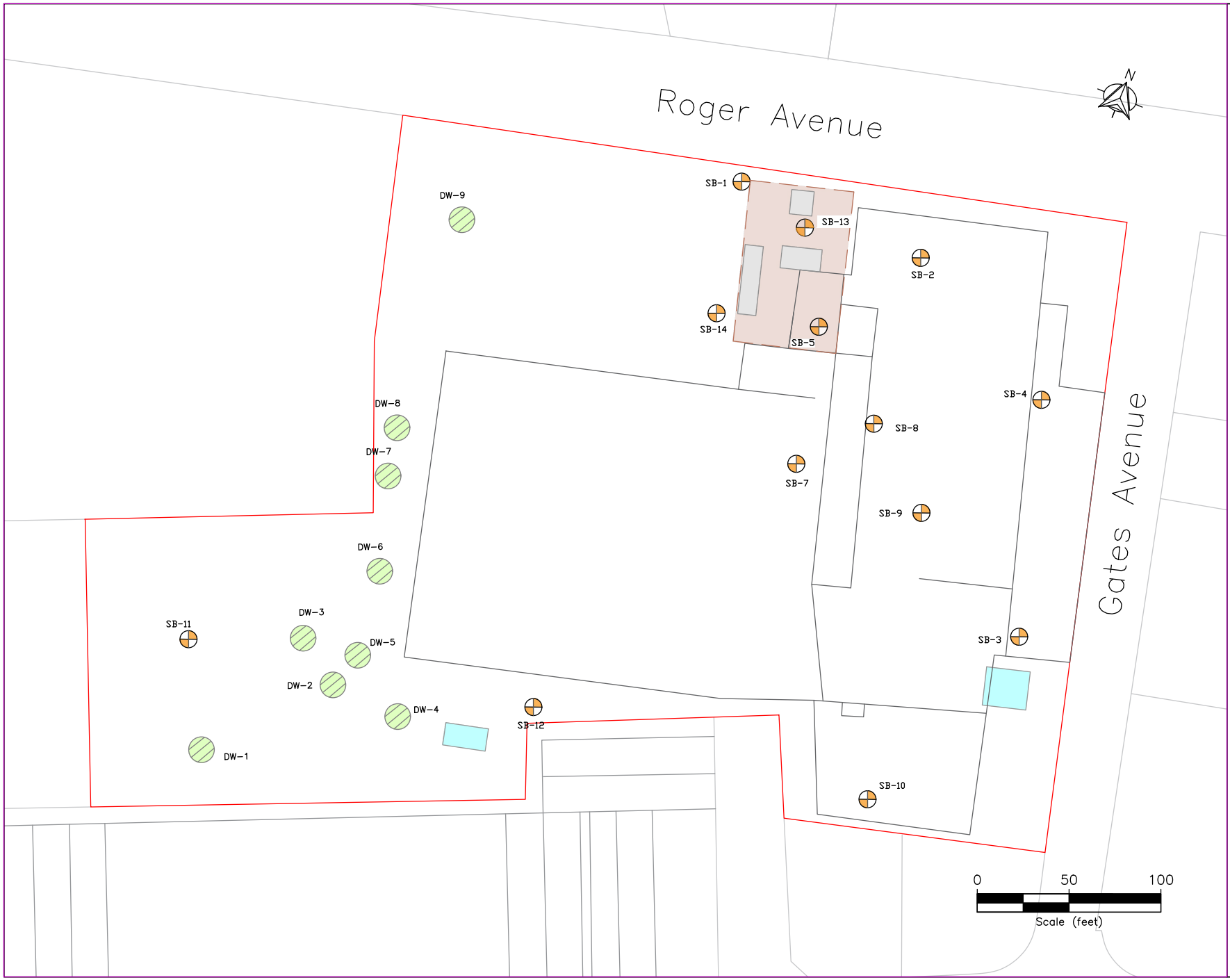
July 2020

Project Number
10188-017

LEGEND

- Tax Lot Boundaries
- Former warehouse Building Outline
- BCP Boundary
- Soil Vapor/Sub-slab Sampling Location
- Ambient Air Sampling Location

Notes:
ND – Non-Detect
J – Estimated Value
Samples collected 1/13/20 – 1/15/20
All values reported in µg/m^3



FILE: /Users/shall/Desktop/Jordan/Figure 9 - Environmental Cut Depths.dwg DATE: 8/28/2020

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY 11096
BCP No. 130164

Figure 9

Soil Remediation Areas

September 2020

Project Number
10188-017

LEGEND

- Former Warehouse Building and Room Outlines
- BCP Boundary
- Soil Boring Sample Location
- Underground Storage Tank (UST)
- Dry Well Excavate to 8 – 10 ft. bgs.
- UST Area Excavate to 7 – 11 ft. bgs.
- Probe for UST Cut Depth TBD (if applicable)

Notes:
bgs. – below ground surface

Tables

Table 8 - Soil Cleanup Objectives
175 Roger Avenue Commercial Development, Inwood, NY
BCP No. C130164; Units in mg/kg

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Metals							
Arsenic	7440-38-2	16[f]	16[f]	16[f]	16[f]	13[f]	16[f]
Barium	7440-39-3	350[f]	400	400	10,000 [d]	433	820
Beryllium	7440-41-7	14	72	590	2,700	10	47
Cadmium	7440-43-9	2.5[f]	4.3	9.3	60	4	7.5
Chromium, hexavalent [h]	18540-29-9	22	110	400	800	1[e]	19
Chromium, trivalent [h]	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50-8	270	270	270	10,000 [d]	50	1,720
Total Cyanide [h]		27	27	27	10,000 [d]	NS	40
Lead	7439-92-1	400	400	1,000	3,900	63[f]	450
Manganese	7439-96-5	2,000[f]	2,000[f]	10,000 [d]	10,000 [d]	1600[f]	2,000[f]
Total Mercury		0.81[j]	0.81[j]	2.8[j]	5.7[j]	0.18[f]	0.73
Nickel	7440-02-0	140	310	310	10,000 [d]	30	130
Selenium	7782-49-2	36	180	1,500	6,800	3.9[f]	4[f]
Silver	7440-22-4	36	180	1,500	6,800	2	8.3
Zinc	7440-66-6	2200	10,000 [d]	10,000 [d]	10,000 [d]	109[f]	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	93-72-1	58	100[a]	500[b]	1,000[c]	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 [e]	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 [e]	136
4,4'- DDD	72-54-8	2.6	13	92	180	0.0033 [e]	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04[g]	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71-9	0.91	4.2	24	47	1.3	2.9

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
delta-BHC	319-86-8	100[a]	100[a]	500[b]	1,000[c]	0.04[g]	0.25
Dibenzofuran	132-64-9	14	59	350	1,000[c]	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan II	33213-65-9	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan sulfate	1031-07-8	4.8[i]	24[i]	200[i]	920[i]	NS	1,000[c]
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36-3	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	83-32-9	100[a]	100[a]	500[b]	1,000[c]	20	98
Acenapthylene	208-96-8	100[a]	100[a]	500[b]	1,000[c]	NS	107
Anthracene	120-12-7	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benz(a)anthracene	56-55-3	1[f]	1[f]	5.6	11	NS	1[f]
Benzo(a)pyrene	50-32-8	1[f]	1[f]	1[f]	1.1	2.6	22
Benzo(b)fluoranthene	205-99-2	1[f]	1[f]	5.6	11	NS	1.7
Benzo(g,h,i)perylene	191-24-2	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benzo(k)fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1[f]	3.9	56	110	NS	1[f]
Dibenz(a,h)anthracene	53-70-3	0.33[e]	0.33[e]	0.56	1.1	NS	1,000[c]
Fluoranthene	206-44-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Fluorene	86-73-7	100[a]	100[a]	500[b]	1,000[c]	30	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5[f]	0.5[f]	5.6	11	NS	8.2
m-Cresol	108-39-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
Naphthalene	91-20-3	100[a]	100[a]	500[b]	1,000[c]	NS	12

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
o-Cresol	95-48-7	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
p-Cresol	106-44-5	34	100[a]	500[b]	1,000[c]	NS	0.33[e]
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8[e]	0.8[e]
Phenanthrene	85-01-8	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Phenol	108-95-2	100[a]	100[a]	500[b]	1,000[c]	30	0.33[e]
Pyrene	129-00-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Volatiles							
1,1,1-Trichloroethane	71-55-6	100[a]	100[a]	500[b]	1,000[c]	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33
1,2-Dichlorobenzene	95-50-1	100[a]	100[a]	500[b]	1,000[c]	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02[f]
cis-1,2-Dichloroethene	156-59-2	59	100[a]	500[b]	1,000[c]	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100[a]	100[a]	500[b]	1,000[c]	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1[e]	0.1[e]
Acetone	67-64-1	100[a]	100[b]	500[b]	1,000[c]	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100[a]	100[a]	500[b]	1,000[c]	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100[a]	100[a]	500[b]	1,000[c]	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33[e]	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100[a]	100[a]	500[b]	1,000[c]	100[a]	0.12

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Methyl tert-butyl ether	1634-04-4	62	100[a]	500[b]	1,000[c]	NS	0.93
Methylene chloride	75-09-2	51	100[a]	500[b]	1,000[c]	12	0.05
n-Propylbenzene	103-65-1	100[a]	100[a]	500[b]	1,000[c]	NS	3.9
sec-Butylbenzene	135-98-8	100[a]	100[a]	500[b]	1,000[c]	NS	11
tert-Butylbenzene	98-06-6	100[a]	100[a]	500[b]	1,000[c]	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100[a]	100[a]	500[b]	1,000[c]	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20-7	100[a]	100[a]	500[b]	1,000[c]	0.26	1.6

All soil cleanup objectives (SCOs) are in parts per million (ppm).
NS=Not specified. See Technical Support Document (TSD).

Source: Part 375, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Table 9 -Technical & Operational Guidance Series 1.1.1 Ambient Water Quality & Guidance Values, Class GA
175 Roger Avenue Commercial Development, Inwood, NY
BCP No. C130164

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Volatile organic compounds	
Acetone	-
Benzene	1
Bromodichloromethane	-
Bromoform	-
Bromomethane	5
2-Butanone (MEK)	-
Carbon disulfide	60
Carbon tetrachloride	5
Chlorobenzene	5
Chloroethane	5
Chloroform	7
Chloromethane	5
Cyclohexane	-
1,2-Dibromo-3-	0.04
Dibromochloromethane	-
1,2-Dibromoethane	0.0006
1,2-Dichlorobenzene	3
1,3-Dichlorobenzene	3
1,4-Dichlorobenzene	3
Dichlorodifluoromethane	5
1,1-Dichloroethane	5
1,2-Dichloroethane	0.6
1,1-Dichloroethene	5
cis-1,2-Dichloroethene	5
trans-1,2-Dichloroethene	5
1,2-Dichloropropane	1
cis-1,3-Dichloropropene	-
trans-1,3-Dichloropropene	-
Ethylbenzene	5
Freon 113	5
2-Hexanone	-
Isopropylbenzene	5
Methyl Acetate	-
Methylcyclohexane	-
Methyl Tert Butyl Ether	10
4-Methyl-2-	-
Methylene chloride	5
Styrene	5
1,1,2,2-Tetrachloroethane	5
Tetrachloroethene	5
Toluene	5
1,2,4-Trichlorobenzene	5
1,1,1-Trichloroethane	5
1,1,2-Trichloroethane	1
Trichloroethene	5
Trichlorofluoromethane	5
Vinyl chloride	2
Xylene (total)	5

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Semivolatile organic compounds	
2-Chlorophenol	-
4-Chloro-3-methyl phenol	-
2,4-Dichlorophenol	1
2,4-Dimethylphenol	1
2,4-Dinitrophenol	1
4,6-Dinitro-o-cresol	-
2-Methylphenol	-
3&4-Methylphenol	-
2-Nitrophenol	-
4-Nitrophenol	-
Pentachlorophenol	1
Phenol	1
2,4,5-Trichlorophenol	-
2,4,6-Trichlorophenol	-
Acenaphthene	-
Acenaphthylene	-
Acetophenone	-
Anthracene	-
Atrazine	7.5
Benzaldehyde	-
Benzo(a)anthracene	-
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	-
Benzo(g,h,i)perylene	-
Benzo(k)fluoranthene	-
4-Bromophenyl phenyl	-
Butyl benzyl phthalate	-
1,1'-Biphenyl	5
2-Chloronaphthalene	-
4-Chloroaniline	5
Carbazole	-
Caprolactam	-
Chrysene	-
bis(2-	5
bis(2-Chloroethyl)ether	1
bis(2-Chloroisopropyl)ether	5
ether	-
2,4-Dinitrotoluene	5
2,6-Dinitrotoluene	5
3,3'-Dichlorobenzidine	5
Dibenzo(a,h)anthracene	-
Dibenzofuran	-
Di-n-butyl phthalate	50
Di-n-octyl phthalate	-
Diethyl phthalate	-
Dimethyl phthalate	-
bis(2-Ethylhexyl)phthalate	5
Fluoranthene	-
Fluorene	-
Hexachlorobenzene	0.04
Hexachlorobutadiene	0.5
Hexachlorocyclopentadien	5
Hexachloroethane	5
Indeno(1,2,3-cd)pyrene	-
Isophorone	-
2-Methylnaphthalene	-
2-Nitroaniline	5
3-Nitroaniline	5
4-Nitroaniline	5
Naphthalene	-
Nitrobenzene	0.4
N-Nitroso-di-n-propylamine	-
N-Nitrosodiphenylamine	-
Phenanthrene	-
Pyrene	-

Contaminant	NY TOGS Class GA GW Standards (NYSDEC 6/2004)
Metals	
Aluminum	-
Antimony	3
Arsenic	25
Barium	1000
Beryllium	-
Cadmium	5
Calcium	-
Chromium	50
Cobalt	-
Copper	200
Iron	300
Lead	25
Magnesium	-
Manganese	300
Mercury	0.7
Nickel	100
Potassium	-
Selenium	10
Silver	50
Sodium	20000
Thallium	-
Vanadium	-
Zinc	-
PCBs/Pesticides	
2,4,5-TP Acid (Silvex)	0.26
4,4'-DDE	0.2
4,4'-DDT	0.2
4,4'-DDD	0.3
Aldrin	ND
alpha-BHC	0.01
beta-BHC	0.04
Chlordane (alpha)	-
delta-BHC	0.04
Dibenzofuran	-
Dieldrin	0.004
Endosulfan I	-
Endosulfan II	-
Endosulfan sulfate	-
Endrin	ND
Heptachlor	0.04
Lindane	0.05
Polychlorinated Biphenyls	0.09

Notes:
Concentrations in µg/L.

Table 10 - New York State Department of Health Air Guidance Values
175 Roger Ave Commercial Development, Inwood, NY
BCP No. C130164, Units in ug/m3

Contaminant	NYSDOH Air Guidance Values
Methylene chloride	60
Tetrachloroethylene	30
Trichloroethylene	5

Table 11 – Permits, Certificates, Approvals and Authorizations
175 Roger Avenue Commercial Development, Inwood, NY
BCP No. C130164

Law, Statute, Code	Originating Agency	Contact Name	Contact Phone
New York State Pollution Discharge Elimination System (6 NYCRR 750) (if required, not anticipated)	Department of Environmental Conservation (NYSDEC)	Jack Nasara Environmental Permits Division Director	(518) 402-9167
Waiver for local permits (6 NYCRR 375.12)	Department of Environmental Conservation (NYSDEC)	John Sheehan DEC Region 1 Environmental Remediation	(631) 444-0244
Road Opening Permit	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516) 571-6840
Sewer Permit	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516)-571-7319
Special Permits (Commercial)	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516)-571-6900
Dumpster Permit	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516)-571-6900
Building Review Permit	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516)-571-6900
Industrial Waste Discharge Permit	Nassau County Dept. of Public Works	Nassau Co. Dept. of Public Works	(516)-571-6900

Table 12 – Emergency Contact List
175 Roger Avenue Commercial Development, Inwood, NY
BCP No. C130164

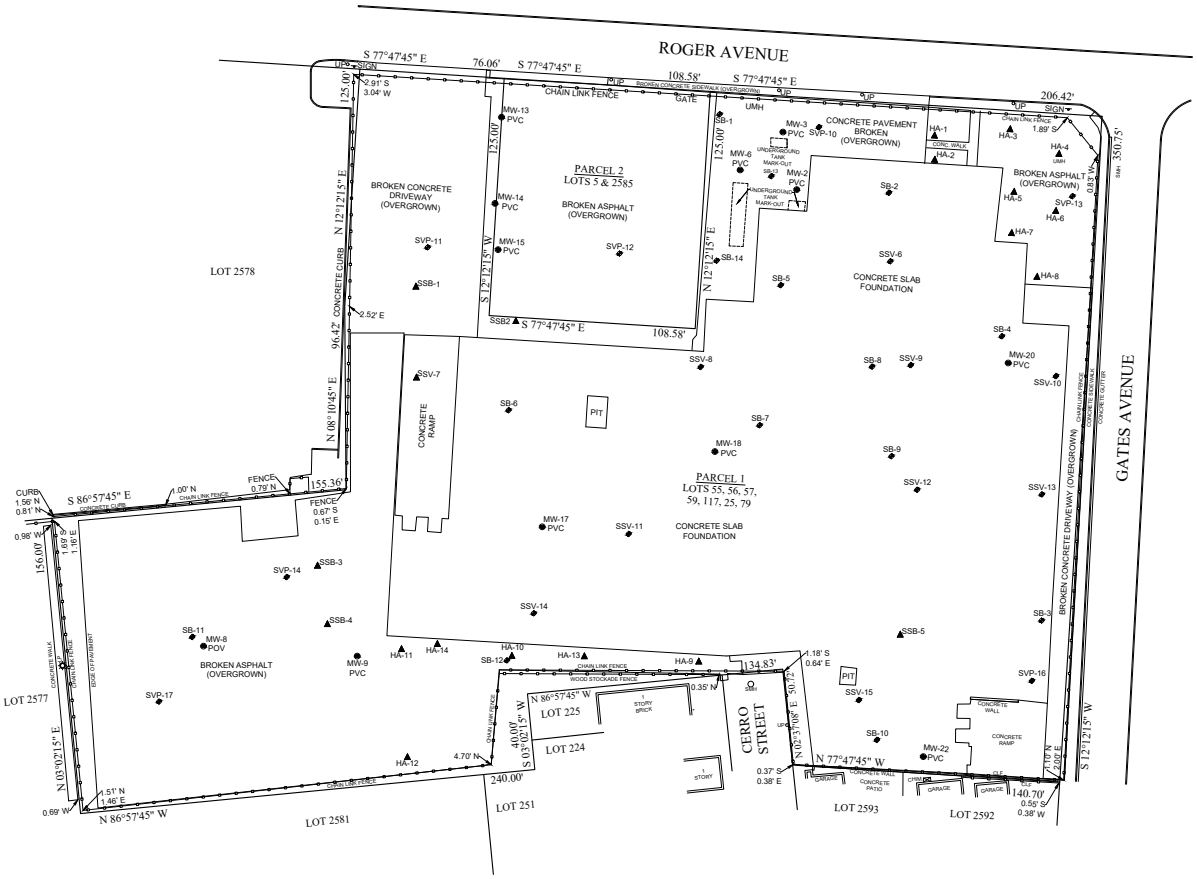
Emergency	
Police Dept.	911
Fire Dept.	911
Emergency Medical Service (ambulance	911
NYSDEC Spill Hotline	(800) 457-7362
National Response Center	(800) 424-8802
St. John's Episcopal Hospital 327 Beach 19th St. Far Rockaway, NY 11691	(718) 869-7000
FE Project Staff	
Arnold F. Fleming, P.E., Remedial Eng.	(212) 675-3225
Fleming-Lee Shue, Inc. Staff	
Steven Panter, Project Manager	(212) 675-3225
Joel Kane, QA/QC Officer	(212) 675-3225
Jordan Arey, Field Supervisor	(212) 675-3225
Inwood 175, LLC & AJM Capital II, LLC	
Adam Mann	(516) 743-9119

APPENDIX A

Survey & Metes and Bounds
Description of the Site

SECTION: 40
BLOCK: L
LOTS:
5,55,56,57,59,117,
2579,2585
TOTAL LOT AREA:
SQ.FT.:154,987.95
ACRES: 3.5580

TITLE SURVEY



REVISED: JUNE 30, 2020

DRAWN BY: MF

15.00' 30.00' 45.00' 90.00'
0 15 45 90 180

SCALE: 1" = 30'

SURVEYED: JUNE 4, 2020

SURVEY OF PROPERTY SITUATED IN:
175 ROGER AVENUE
TOWN OF INWOOD
COUNTY OF NASSAU
STATE OF NEW YORK

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.

COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID TRUE COPY.

GUARANTEES INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, AND ON HIS BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND LENDING INSTITUTION LISTED HEREON, AND TO NO OTHER PERSONS OR THE LENDING INSTITUTION. GUARANTEES ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

FEHRINGER SURVEYING, P.C.
ROBERT FEHRINGER
LICENSED LAND SURVEYOR
WWW.FEHRINGERSURVEYING.COM
2200 JACKSON AVENUE
SEAFORD, N.Y. 11783
(516) 763 - 5515 FAX NO. (516) 763 - 5525
FS@FEHRINGERSURVEYING.COM

PARCEL 1

(Lots 55, 56, 57, 59, 117, 2579)

ALL that certain plot, piece or parcel of land, with the buildings thereon erected, situate, lying and being at Inwood, Town of Hempstead, County of Nassau and State of New York, more particularly bounded and described as follows:

BEGINNING at the corner formed by the intersection of the southerly side of Roger Avenue with the westerly side of Gates Avenue;

RUNNING THENCE south 12 degrees 12 minutes 15 seconds west along the westerly side of Gates Avenue 350.75 feet;

THENCE north 77 degrees 47 minutes 45 seconds west 140.70 feet to the easterly side of Cerro Street;

THENCE north 2 degrees 37 minutes 08 seconds east along the easterly side of Cerro Street 50.72 feet;

THENCE north 86 degrees 57 minutes 45 seconds west 134.83 feet;

THENCE south 3 degrees 02 minutes 15 seconds west 40 feet;

THENCE north 86 degrees 57 minutes 45 seconds west 240 feet;

THENCE north 3 degrees 02 minutes 15 seconds east 156 feet;

THENCE south 86 degrees 57 minutes 45 seconds east 155.36 feet;

THENCE north 8 degrees 10 minutes 45 seconds east 96.42 feet;

THENCE north 12 degrees 12 minutes 15 seconds east 125 feet to the southerly side of Roger Avenue;

THENCE south 77 degrees 47 minutes 45 seconds east along the southerly side of Roger Avenue 76.06 feet to the land now or formerly of Vandeveer;

THENCE south 12 degrees 12 minutes 15 seconds west along the preceding land 125 feet;

THENCE south 77 degrees 47 minutes 45 seconds east along the preceding land and the land of others, 108.58 feet;

THENCE north 12 degrees 12 minutes 15 seconds east 125 feet to the southerly side of Roger Avenue;

THENCE south 77 degrees 47 minutes 45 seconds east along the southerly side of Roger Avenue, 206.42 feet to the point or place of beginning.

TOGETHER WITH an easement over that portion of State Road (Knoll Street) lying between Bayview Avenue and the southerly line of the above described premises, subject to the rights of others, in, to and over said state Road (Knoll Street).

PARCEL 2
(Lots 5 and 2585)

ALL THAT certain plot, piece or parcel of land, with the buildings thereon erected, situate, lying and being at Inwood in the Town of Hempstead, County of Nassau and State of New York, bounded and described as follows:

BEGINNING at a point on the southerly side of Roger Avenue distant westerly 206.42 feet from the corner formed by the intersection of the westerly side of Gates Avenue (Gater Street) with the southerly side of Roger Avenue, and from said point;

RUNNING southerly at right angles to the southerly side of Roger Avenue 125 feet to land formerly of Robert McCafferty;

THENCE RUNNING westerly along the said land formerly of McCafferty and parallel with the southerly side of Roger Avenue 108.58 feet to land of Inwood Holding Corp.;

THENCE RUNNING northerly along said land at right angles to the southerly side of Roger Avenue 125 feet to the southerly side of Roger Avenue; and

THENCE RUNNING easterly along the southerly side of Roger Avenue 108.58 feet to the point or place of beginning.

The above described parcel 2 is contiguous on its Southerly, Easterly and Westerly sides with parcel I.

PARCEL 3
(Lot 11)

ALL that lot or piece of land, situate, lying and being at Inwood, Town of Hempstead, County of Nassau, New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the easterly side of Gates Avenue (Gater Street) with the southerly side of Roger Avenue;

THENCE easterly along the southerly side of Roger Avenue 100 feet;

THENCE southerly parallel with Gates Avenue 100 feet;

THENCE westerly parallel with Roger Avenue 100 feet to the easterly side of Gates Avenue;

THENCE northerly along the easterly side of Gates Avenue 100 feet to the point or place of beginning.

The premises is also known as 175 Roger Avenue, Inwood, Nassau County, New York.

To the Clerk of the County of Nassau:

You are hereby required to index this notice against the names of all the above-named defendants and against the block on the map of the county hereinabove designated.

Dated: Brooklyn, New York
April 30, 1996

ZACHARY W. CARTER
United States Attorney
Eastern District of New York
Attorney for Plaintiff
1 Pierrepont Plaza - 14th Floor
Brooklyn, New York 11201

By: _____
STANLEY N. ALPERT
Assistant U.S. Attorney
(718) 254-6023/7000

APPENDIX B

Supplemental Remedial
Investigation Report

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 1
SUNY @ Stony Brook, 50 Circle Road, Stony Brook, NY 11790
P: (631) 444-0240 | F: (631) 444-0248
www.dec.ny.gov

December 23, 2020

Mr. Steven E. Panter, PG
Senior Consultant
Fleming-Lee Shue, Inc.
158 West 29th Street
New York, NY, 10001

Re: 175 Roger Avenue Site
175 Roger Avenue
Inwood, New York
Site #: C130164
Supplemental RI Report

Dear Mr. Panter:

The New York State Department of Environmental Conservation (the Department) and the New York State Department of Health (NYSDOH) have reviewed Fleming-Lee Shue Inc's revised Supplemental Remedial Investigation (SRI) report dated November 2020 pertaining to the 175 Roger Avenue site, NYSDEC site # C130164. The report was prepared to present the procedures and results of the implementation of the approved SRI work plan. Based on our review of the revised report, the report has addressed the Department's comments presented in our letter to you dated October 30, 2020 and our subsequent comment letter dated November 20, 2020. As a result, the report is deemed complete and thus is acceptable. At this time, please proceed with the development of the project's Remedial Action Work Plan (RAWP) and Alternative Analysis (AA). If you should have any questions, feel free contact me at (631)-444-0244 or via e-mail at john.sheehan@dec.ny.gov

Sincerely,

John C. Sheehan, P.G.
Professional Geologist 1

ec: R. Mustico, NYSDEC
C. Engelhardt, NYSDEC
C. Bethoney, NYSDOH
D. Tucholski, NYSDOH
A. Mann, AJM Capital
A. Fleming, Fleming-Lee Shue

175 Roger Avenue Commercial Development
Brownfield Cleanup Program Site No. C130164

Section 40; Block L: Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

Supplemental Remedial Investigation Report

Prepared for

Inwood 175, LLC & AJM Capital II, LLC

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

Prepared by

Fleming Engineering
158 West 29th Street
New York, New York 10001

November 2020

Professional Engineer's Certification

175 Roger Avenue Commercial Development
Brownfield Cleanup Program
Site No. C130164
Section 40; Block L: Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

Supplemental Remedial Investigation Report

November 2020

I, Arnold F. Fleming, P.E., certify that I am currently a Licensed Professional Engineer in New York State and Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this *Supplemental Remedial Investigation Report* 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 BCP (Site No. C130164) work plan and any DER-approved modifications.

11/24/20
Date

Arnold F. Fleming, P.E.
New York State Professional Engineer
License Number 050411

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EXECUTIVE SUMMARY

This Supplemental Remedial Investigation Report (SRIR) was prepared by Fleming Engineering (FE) for Inwood 175, LLC and AJM Capital II, LLC (Volunteer) to investigate the property at 175 Roger Avenue, Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York (Site). The Site is known as 175 Roger Avenue, Brownfield Cleanup Program (BCP) Site No. C130164.

The Site is bound by Roger Avenue to the north, Lots 2577 and 2578 to the west, which are utilized for commercial trucking and freight operations, Gates Avenue to the east, and numerous small residential lots along Bayview Avenue to the south. All Site buildings were razed to grade by February 2019 and as of the date of this report the Site consists of concrete slab(s) covering roughly one-third of the Site and asphalt covering the remainder, with the exception of several thin strips of broken asphalt along the property margins. The Site is currently unoccupied, but historically, the principal activities were sheet metal fabrication, auto repair, and warehousing. Figure 1 shows the Site location. Figure 2 is a Site plan.

The current redevelopment plan contemplates a commercial warehouse on the Site. It is anticipated that construction will excavate approximately 20 percent of the soil within the planned building footprint to four to five feet below grade to accommodate footings. The data collected by ATC from 2005 through 2008, indicated that shallow soils on Site were essentially free of contamination from Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs) and metals.

The last known material environmental Site information was collected in June 2008 as a part of a New York State Department of Environmental Conservation (NYSDEC) BCP Remedial Investigation prepared by ATC Associates Inc. (ATC) in 2009. The 2008 ATC data included two locations where VOCs and metals exceeded the Commercial Use Soil Cleanup Objectives (CUSCOs), metals at 0.5 feet and VOCs at seven feet. SVOCs were all below the CUSCOs.

The primary environmental concern reflected in the 2008 ATC data was groundwater impacted by VOCs, principally Tetrachloroethene (PCE). Impacted groundwater occurred primarily in the northeast section of the Site, corresponding to the locations of the former xylene tanks, paint spraying booth and paint drying room. Because the ATC data were 12 or more years old, NYSDEC and FE concluded that the data needed updating to accurately represent current Site conditions and to fill data gaps at depth. This was completed as a Supplemental Remedial Investigation (SRI) performed by the Volunteer.

The SRI was completed in January – May 2020 and executed in two Phases. As described in the Supplemental Remedial Investigation Work Plan (SRIWP), ATC data were used to identify four areas of concern to focus the investigation: (1) Solvent Plume Area, (2) Chlorinated VOC Degradation, (3) Exposed Soil Area, and (4) General Site Area. Phase I included groundwater sampling of the existing monitoring wells, soil vapor sampling, and shallow soil sampling. The results of the Phase I groundwater sampling indicated that the areas of concern described in the SRIWP are no longer relevant. Therefore, the Phase II sampling focused on collecting

information from the following areas: (1) Exposed Soil Area, (2) UST Area in the northeast portion of the Site, (3) Drywell Area, and (4) Plant Area, as depicted on Figure 2.

Phase II included soil and temporary groundwater sampling at varying intervals to a depth of 35 feet below grade, the depth at which ATC's investigation inferred a site-wide clay stratum, and limited number of additional shallow soil samples to the water table. The number and locations of Phase II samples were modified slightly from those identified in the SRIWP, based on the results of the Phase I sampling. Correspondence describing these modifications and approval by NYSDEC before Phase II sampling began is included in Appendix A.

The 2020 Phase I SRI sampling results found VOC groundwater concentrations greatly reduced from the 2008 ATC results; the impacted areas were also significantly reduced compared with the results from 12 years ago. Elevated PCE in groundwater occurred in two locations on the eastern and southern Site property lines at concentrations more than an order-of-magnitude lower than in 2008. The other impacted area centered on the Underground Storage Tanks (USTs) in the northeast corner of the Site. All Phase I soil samples were below the CUSCOs and most were below the Restricted Residential Soil Cleanup Objectives (RRSCOs). Soil vapor VOC concentrations were at very low levels throughout most of the Site. Elevated PCE and Trichloroethene (TCE) soil vapor concentrations occurred in two locations on the eastern property boundary. These appear related to a localized surface spill rather than from deeper soil and groundwater sources.

The 2020 Phase II SRI found metals and VOCs above the Unrestricted Use Soil Cleanup Objectives (URSCOs) primarily in the UST Area in the northeast portion of the Site. Soils mostly met the RRSCOs, except for one shallow location with Semivolatile Organic Compounds (SVOCs) modestly above the RRSCOs, and one relatively shallow VOC location in the UST Area, and a few low level arsenic concentrations. Soils met the CUSCOs in nearly all instances except for a few low level arsenic concentrations that appear to be native soil background levels.

The only soil area where concentrations are materially above the URSCOs, RRSCOs, and CUSCOs are metals in the drywells on the western side of the Site. These structures acted as sinks and likely collected runoff from vehicles and materials storage where sludge with metals accumulated. We believe it is the sludge in the drywells that contains metals as opposed to soils.

Samples from the temporary sampling points indicate groundwater throughout the Site is impacted by PCE and its degradation daughter compounds TCE, cis-1,2-dichloroethene (DCE), and vinyl chloride (VC). The concentrations are greatest in the UST Area at 30 to 35 feet below grade, but PCE levels in the UST Area have decreased three-fold since 2008. Beyond the UST area, PCE levels decrease appreciably. On a Site-wide basis, PCE concentrations above 300 µg/L have decreased approximately 10 percent compared to 2008. Xylenes in groundwater are elevated in the UST Area.

A Remedial Action Work Plan (RAWP) will follow approval of this report by NYSDEC. It is anticipated that the RAWP will focus on removing source material and USTs in the UST Area in the northeastern portion of the Site and removal of the drywells on the western side of the

Site. Periodic groundwater monitoring to evaluate groundwater conditions subsequent to source removal should be incorporated into the RAWP.

1.0 INTRODUCTION

The Supplemental Remedial Investigation (SRI) described in this report focused on collecting data to update Site investigation information obtained in 2008 on the principal Contaminants of Concern (COCs), which are the VOC solvents formerly used in Site operations. The main COC is Tetrachloroethene (PCE) and to a lesser extent Trichlorethene (TCE), and the daughter breakdown products. Non-chlorinated solvents are locally important in the UST area in the northeast portion of the property. Metals are locally important in the drywells. For metals in groundwater, the emphasis is on filtered metals samples in order to eliminate the potential bias introduced by sediment in the samples.

The data obtained through Phase I and Phase II of the 2020 SRI updates prior Site information with current data, fills in data gaps by collecting more data throughout the soil profile to depth, sufficient to complete an exposure assessment, and to prepare a Remedial Action Work Plan. A copy of the SRI Work Plan, and correspondence with NYSDEC describing modifications to Phase II sampling and approval by NYSDEC are included as Appendix A.

2.0 SITE DESCRIPTION AND HISTORY

2.1 SITE LOCATION

The property is located at 175 Roger Avenue Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York (Site). The Site consists of eight irregular-shaped tax lots that occupy approximately 3.56 acres (Section 40; Block L; Lots 5, 55, 56, 57, 59, 117, 2579, and 2585 on the Nassau County Land & Tax Map). Roger Avenue borders the Site on the north, Gates Avenue fronts the east, residential buildings and Bayview Avenue lie to the south, and Expeditors Freight Service borders the Site on the west.

2.2 SITE DESCRIPTION

Nassau County began demolition of the existing buildings located on the Site in October 2018 and completed demolition in February 2019. The Site is currently vacant and an open space. The poured concrete floor of the former building occupies approximately one-third of the Site. The balance of the Site is covered with asphalt except for two small areas of broken asphalt in the northeast corner and south-central portion of the Site. The Site topography is flat. The average Site elevation is approximately 8.5 feet North American Vertical Datum 1988 (NAVD88). Site elevation ranges from 7 feet to 9 feet NAVD88.

2.3 HISTORIC SITE USE

FE performed a Phase I Environmental Site Assessment in November 2018. Historically, the Site was developed with a 155,000 square foot, one-story, warehouse building and a 2-story

warehouse and office, which were constructed in several stages from 1954 to approximately 1967. The Site operated as a "Sheet Metal Fabrication" factory since at least 1961. Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste material improperly stored and disposed of on-Site. In June 1992, the United States Environmental Protection Agency (EPA) conducted a Site inspection and discovered approximately two hundred forty 55-gallon deteriorated and/or leaking drums, a 5,000-gallon tanker trailer, underground storage tanks (USTs), and observed dry wells containing sludge materials. In order to address the hazardous condition, the EPA conducted an Emergency Removal Action beginning in August 1993. The drums, tanker trailer, one (1) 1,000-gallon heating oil UST, and UST piping were removed. The Site was then used largely as a warehouse by various tenants from 1990 to 2004 including an auto repair shop (Gunter Auto Shop) and Long Island Party Rentals. The Site was acquired by Nassau County in 1995 and has remained vacant since approximately 2004. The warehouse building on Site was damaged in a fire in February 2011, which damage ultimately led to Nassau County demolishing the buildings as discussed above. The Nassau County land records and deed registry is incomplete before 1990 but Site ownership varied over the years as follows:

Date	Owner
1954 - circa 1967	Sheet Metal Fabrication
1971 - 1987	Rockaway Metal Products
1993 - 1995	175 Roger Corp.
1995 - present	Nassau County

According to the environmental database review, the Site contained a number of USTs, which varies depending on source. There were discrepancies between the database and ATC reports on the number of USTs. Collectively, there appears to have been upwards of seven (7) USTs historically and potentially four (4) that currently remain abandoned in place. According to the database review, contents of all of the tanks reportedly included fuel oil, gasoline, xylene and naphthalene.

A Site Investigation conducted by ATC Associates Inc. in May 2005 included an electromagnetic ground penetrating radar (EM/GPR) survey that identified seven (7) underground anomalies thought to be USTs and/or buried drums. It is not clear if these tanks remain on the Site.

2.4 VICINITY CHARACTERISTICS AND NEARBY PUBLIC AREAS OF CONCERN

The use of the immediately adjoining properties is a mix of commercial and residential. An Eastern Shell Fuel Terminal formerly occupied the property to the northwest of the Site from 1942 through 1972. Given the proximity of the fuel terminal to the Site and the

likelihood that groundwater flow in this area is influenced by tidal fluctuations, further investigation was needed in the northwest portion of the Site to determine if the former Eastern Shell terminal has impacted groundwater beneath the Site.

2.5 DESCRIPTION OF CONTEMPLATED USE

The Volunteer proposes to redevelop the property with a slab on grade structure for commercial uses, which shall include a combination of office and warehousing. Exact dimensions of proposed building are not known at this time.

2.6 SITE GEOLOGY, HYDROGEOLOGY, AND SUBSURFACE CHARACTERISTICS

2.6.1 Site Geology

The Site is located within the New England Physiographic Province, which is underlain by metamorphic and sedimentary rocks of the Cambrian and Ordovician period.

According to the Geologic Map of New York City (Brock & Brock 2001), the western end of Long Island is underlain by sedimentary layers that strike northeast and are inclined gently to the southeast. These layers appear at or near the surface in the vicinity of Long Island Sound, where differential erosion has left relatively young sands and clays at elevations of more than 60 feet above sea level.

Resting on top of these sands and clays and forming the highest elevation is a belt of glacially deposited debris composed of an unsorted, unstratified mixture of boulders, sand, silt, and clay. This debris was deposited in the interval between 75,000 and 17,000 years ago when the area was covered by a massive sheet of glacial ice. In the vicinity of New York, the ice was moving in a generally southerly direction, bringing with it a huge load of detached bedrock, sediment, and soil that it had scoured from more northerly regions. This rocky debris was dumped as the periphery of the glacier melted, forming a belt of hills known as a terminal moraine.

Sloping gently southeastward from the edge of the terminal moraine is generally an apron of sediment (outwash plain) that slopes very gently toward the Atlantic Ocean. This rests on the underlying inclined sedimentary layers, and was formed through the accumulation of sand, silt, and mud deposited by streams carrying away meltwaters from the glacial ice. The sharp edge between terminal moraine and outwash plain constitutes the major element of the northeast trend. Additionally, the Site's location in Jamaica Bay, a salt water body, indicates a high likelihood of the presence of a meadow mat due to historical wetland presence in the area.

2.6.2 Site Hydrogeology

Information regarding groundwater was obtained from the USGS Ground Water Atlas of the United States (1995). The principal aquifer in the Site area is the Northern Atlantic Coastal Plain aquifer system, which consists of the Magothy aquifer and the underlying Lloyd aquifer. Both aquifers consist primarily of sand and gravel. The Magothy aquifer provides most of the water for public supply in southeast Queens, Nassau, and western Suffolk Counties. The Lloyd aquifer provides most of the water for public supply for the northwest-shore area of Long Island.

The entire Magothy Formation forms the Magothy aquifer, which is a fine to medium sand with some clay and coarse sand and gravel. The Magothy aquifer is overlain by and hydraulically connected with the upper glacial aquifer. Yields of wells completed in the Magothy aquifer commonly range from 50 to 1,200 gallons per minute and might exceed 2,000 gallons per minute.

According to a Site Investigation conducted on Site in 2005 by ATC Associates (ATC) and subsequent reports available on the NYCDEC Environmental Site Remediation Database a groundwater divide runs through the center of the Site, with apparent groundwater flow towards both the northwest and southeast. Physiographically, the Site is on a peninsula that extends into Jamaica Bay where salt water surrounds the peninsula on three sides (refer to Sections 4.2, *Groundwater Flow* and 4.7, *Tidal Survey Results*, for the findings of this SRI).

2.7 NATURE & EXTENT OF CONTAMINATION

2.7.1 Previous Investigations

The Site was investigated in several previous environmental investigations and remedial documents beginning in 2005. The studies investigated soils, groundwater, soil vapor, Site history, and adjacent land use. These reports are provided in Appendix A. Previous investigations and relevant documents include the following:

1. Phase I Environmental Site Assessment of Long Island Party Rentals, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 19, 2005.
2. Site Investigation Report Long Island Party Rentals, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 27, 2005.
3. NYSDEC Brownfield Cleanup Program Remedial Investigation Work Plan, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2007.
4. NYSDEC Brownfield Cleanup Program Remedial Investigation Report, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., July 8, 2009.

5. NYSDEC Brownfield Cleanup Program Alternative Analysis Report Remedial Work Plan, 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2010.
6. Draft Phase I Environmental Site Assessment, 175 Roger Avenue, Inwood, New York 11096. Fleming-Lee Shue, Inc., November 2018.

2.7.2 Summary of Pre-SRI Environmental Contamination

Subsequent to the initial 2005 investigation, ATC completed additional Site investigation work in 2007-2008 that was reported in the July 8, 2009 Remedial Investigation Report. The information provided in the 2009 report and the other historical ATC reports was used to develop the SRI sampling program. Analysis of the historical data was used to prepare the ensuing analytical summary sections, which summarize the Site's environmental status before the SRI. The analytical data from the ATC reports covered the period from 2005 through 2008.

There are several reasons why additional data needed to be collected to properly characterize the Site and to assess the need for remediation. First, the ATC data were old, the most recent samples date back to 2008. Thus, it has been 12 or more years since data have been collected on this Site. It is therefore very likely that concentrations have radically changed and that the location of contamination has also altered due to migration, degradation, and chemical transformation. Second, the ATC data collection was concentrated around the USTs in the northeast portion of the Site leaving the remainder of the Site with a reduced sampling density. Third, most of the ATC samples were collected in relatively shallow intervals, leaving information gaps at depth. For example, 62 percent of the (37) VOC soil samples collected were collected from grade to 7 feet and 84 percent of the samples were collected to a depth of 12 feet. Only 8 percent of the ATC samples were collected at 35 to 40 feet near the top of the clay layer. Consequently, there were data gaps about conditions at depth and in areas removed from the northeast portion of the Site and the available information was too old to reliably inform an understanding of current Site conditions. This made the ATC dataset only partially complete for adequately characterizing the Site refer to Section 4.1, Stratigraphy, for the results of this SRI.)

2.7.3 Soil Contamination

The data summaries describe Site soil conditions based on data collected by ATC from 2005 to 2008. Most soil samples were collected at shallow depths and comparatively few soil samples have been collected below 12 feet below grade. The results of the ATC investigation indicated that nearly all shallow soils met the Commercial Use Soil Cleanup Objectives (CUSCOs).

Volatile Organic Compounds

The primary soil contaminants were the chlorinated and non-chlorinated solvents likely

associated with the historic on-Site degreasing, painting, USTs, drums, and general commercial and automotive operations. Table 1 summarizes the range of VOCs with elevated concentrations detected on Site by ATC.

Table 1 – Summary of Soil VOCs, 2005 – 2008, µg/kg (ATC)

VOC	N	Min	p25	p50	p75	Max
Acetone	55	nd	nd	43	69	150,013
n-Butylbenzene	38	nd	nd	nd	nd	5,000
1,2-Dichloropropane	40	nd	nd	nd	nd	34,100
Isopropylbenzene	38	nd	nd	nd	nd	83,000
p-isopropyltoluene	11	nd	nd	nd	nd	14,700
4-Methyl-2-pentanone	63	nd	nd	nd	nd	1,450,000
Methylene Chloride	44	nd	nd	nd	14.5	2,011
n-Propylbenzene	38	nd	nd	nd	nd	120,000
Toluene	34	nd	nd	nd	nd	11,000
1,2,4-Trimethylbenzene	59	nd	nd	nd	20	870,000
1,3,5-Trimethylbenzene	38	nd	nd	nd	17	390,000
Total Xylenes	49	nd	nd	nd	40	740,000

N – No. observations. Min. – minimum value, p25 – 25th percentile, p50 – 50th percentile, p75 – 75th percentile, Max – maximum value. nd - non-detect.

VOCs in soils were mostly below detection limits, and all VOCs except 1,2,4-Trimethylbenzene, 1,3,5-Trimenthybenzene, and Total Xylenes were below the CUSCOs. The three VOCs found above the CUSCOs are limited to one boring (SB-05) at a depth of seven feet near the underground storage tanks in the northern portion of the Site.

Semi-Volatile Organic Compounds

Most SVOC compounds were below detection limits and all SVOCs were below the CUSCOs. The detected SVOCs were primarily plasticizers, fuel-related, and combustion compounds. Table 2 summarizes the range of key SVOCs detected by ATC throughout the Site.

Table 2 – Summary Soil SVOCs, 2005 – 2008, µg/kg (ATC)

SVOC	N	Min	p25	p50	75	Max
Butyl Benzyl Phthalate	18	nd	nd	nd	nd	4,000
Di-n Butyl Phthalate	10	nd	nd	nd	nd	600
Bis-2-Ethylhexyl Phthalate	18	nd	nd	nd	430	4,000
Fluoranthene	18	nd	nd	nd	nd	44
2-Methylnaphthalene	17	nd	nd	nd	310	4,900
Naphthalene	55	nd	nd	nd	30	9,200
Phenanthrene	18	nd	nd	nd	nd	3,800
Pyrene	18	nd	nd	nd	nd	2,200

Metals

All but three metals were below the CUSCOs. Cadmium, lead, copper, and mercury were above the CUSCOs in one sample, DW-3, a drywell sample in the parking area near the southwest corner of the Site at a depth of 0.5 feet. Table 3 summarizes the range of key metals detected on Site by ATC.

Table 3 – Summary Soil Metals, 2005 – 2008, mg/kg (ATC)

Metal	N	Min	p25	p50	p75	Max
Antimony	18	nd	nd	nd	nd	nd
Arsenic	39	nd	nd	2.41	4.12	5.76
Beryllium	18	nd	nd	nd	nd	nd
Cadmium	18	nd	nd	nd	nd	15
Chromium	39	1.83	3.98	6.2	8.2	61
Lead	39	nd	nd	5.2	12.7	840
Mercury	39	nd	nd	nd	nd	4.1
Nickel	39	nd	nd	nd	5	37
Selenium	18	nd	nd	nd	nd	nd
Silver	18	nd	nd	nd	nd	3
Thallium	18	nd	nd	nd	nd	nd
Zinc	39	nd	6.1	12.7	32	520

Pesticides

Pesticides were not sampled in the previous investigations.

Polychlorinated Biphenyls (PCBs)

ATC collected one concrete chip sample from beneath two fluid-filled transformers with heavy staining on the concrete pad in 2005. Testing found Aroclor 1260 at a concentration of 227 µg/kg in the sample.

2.7.4 Groundwater Contamination

The below summaries describe historic Site groundwater conditions based on data collected by ATC from 2005 to 2008.

Volatile Organic Compounds

The principal VOC compounds found in Site groundwater by ATC are summarized in Table 4. The primary chlorinated VOC (CVOC) was PCE with concentrations reaching 15,000 µg/L. The concentrations of CVOCs appeared highest in the northeast corner of the Site near the USTs, former Paint Spraying Booth, and former Paint Drying Room. CVOC concentrations were also greatest in groundwater at 30 to 35 feet bgs, just above the clay

layer. Conversely, the CVOC cis 1,2,-DCE had its highest concentrations near the center of the property. Non-chlorinated VOC concentrations were also greatest in the northeast portion of the Site, near the underground storage tanks and former paint spraying booth, although their concentrations generally did not increase with depth.

Table 4 – Summary of Groundwater VOCs, 2005 – 2008, µg/L (ATC)

VOC	N	Min	p25	p50	p75	Max
Tetrachloroethene (PCE)	144	nd	nd	8.5	52	15,000
cis-1,2-dichloroethene (DCE)	132	nd	nd	8.5	230	9,300
Trichloroethene (TCE)	132	nd	nd	nd	30	6,100
Vinyl Chloride	118	nd	nd	nd	13	900
Acetone	105	nd	nd	nd	nd	7,313
Ethylbenzene	131	nd	nd	1	14	16,000
1,2,4-Trimethylbenzene	139	nd	nd	0.5	17	94,000
1,3,5-Trimethylbenzene	139	nd	nd	nd	4	17,001
Isopropylbenzene	95	nd	nd	nd	2	4,700
n-Propylbenzene	139	nd	nd	nd	1	7,300
Toluene	126	nd	nd	1	8	42,000
Total Xylenes	126	nd	nd	2.5	52	107,000

Semi-volatile Organic Compounds

Table 5 summarizes the SVOCs found in Site groundwater by ATC. SVOCs occurred at very low levels throughout most of the Site. Naphthalene in concentrations above the Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards (AWQS) Class GA guideline of 10 µg/L occurred near the underground storage tanks in the northeast portion of the Site and west of the former paint spraying booth.

Table 5 – Summary of Groundwater SVOCs, 2005 – 2008, µg/L (ATC)

SVOC	N	Min	p25	p50	p75	Max
1,4-Dichlorobenzene	120	nd	nd	nd	nd	2
2,4-Dimethylphenol	46	nd	nd	nd	nd	43
Dinbutyl Phthalate	34	nd	nd	nd	nd	9.6
Bis 2 Ethylhexyl Phthalate	21	nd	nd	nd	nd	1
2-Methylnaphthalene	20	nd	nd	nd	nd	87.5
2-Methylphenol	34	nd	nd	nd	nd	7.8
3,4-Methylphenol	34	nd	nd	nd	nd	24.2
Naphthalene	83	nd	nd	nd	13	327

Metals

Table 6 presents a summary of total metals found in Site groundwater by ATC. Metal concentrations above TOGS included lead, selenium, and thallium. Lead was above its

groundwater criterion in the north central portion of the Site and in the southwest portion near the drywells. Selenium and thallium were above their groundwater criteria in the north central portion of the Site.

Table 6 – Summary of Groundwater Total Metals, June 2008, µg/L (ATC)

Metal	N	Min	p25	p50	p75	Max
Arsenic	26	nd	nd	nd	nd	nd
Antimony	26	nd	nd	nd	nd	nd
Beryllium	26	nd	nd	nd	nd	2.64
Cadmium	26	nd	nd	nd	nd	2.12
Chromium	26	nd	nd	nd	12.1	39.1
Copper	26	nd	nd	2.7	8.6	30.1
Lead	26	nd	nd	nd	18.6	69
Mercury	26	nd	nd	nd	nd	nd
Nickel	26	nd	nd	nd	nd	42.9
Silver	26	nd	nd	nd	nd	nd
Selenium	26	nd	nd	nd	nd	21.3
Thallium	26	nd	nd	nd	27.5	52.4
Zinc	26	nd	nd	nd	nd	142

Emerging Contaminants

In September 2018, Nassau County sampled two wells (MW-9 and MW-15) for Polyfluoroalkyl Substances (PFAS), and 1,4-Dioxane under the recent NYSDEC sampling guidance for these compounds. The results found a non-detect result for 1,4-Dioxane. PFAS compounds ranged from non-detect to 47 nanograms/liter (ppt). The current USEPA Health Advisory level is 70 ppt for all PFAS and New York State has adopted a drinking water standard of 10 ppt for two PFAS: PFOA and PFOS.

PFOA results were higher in MW-1, near the eastern Site boundary, compared with the results from MW-9 and MW-15, which are further into the interior of the Site.

2.7.5 Sub-Slab Vapor, Soil Vapor and Indoor Air Findings

ATC collected sub-slab vapor, soil vapor, and indoor air samples on 6/8/2005, 8/30/2007, 8/28/2007, and 8/29/2007, respectively (all prior to demolition of the Site buildings in 2018/2019). Tables 7, 8, and 9 summarize the indoor air, sub-slab soil vapor, and soil vapor VOC results for the principal compounds impacting the Site.

Table 7 - Summary of 2007 Indoor Air VOCs, µg/m^3 (ATC)

VOC	N	Min	p25	p50	p75	Max	NYSDOH Air Guidance Value
Carbon Tetrachloride	2	0.43	0.43	0.44	0.45	0.45	
Trichloroethene (TCE)	2	nd	nd	0.21	0.43	0.43	2
Tetrachloroethene (PCE)	2	nd	nd	2.7	5.4	5.4	30
1,1,1-Trichloroethane	2	nd	nd	nd	nd	nd	
Methylene Chloride	2	3.8	3.8	5.2	6.6	6.6	60
Acetone	2	nd	nd	nd	nd	nd	
2-Butanone (MEK)	2	nd	nd	nd	nd	nd	
Chloroform	2	0.24	0.24	0.25	0.25	0.25	
4-Ethyl Toluene	2	0.59	0.59	0.9	1.2	1.2	
Ethylbenzene	2	0.83	0.83	0.97	1.1	1.1	
1,2,4-Trimethylbenzene	2	nd	nd	nd	nd	nd	
1,3,5-Trimethylbenzene	2	0.25	0.25	0.42	0.59	0.59	
mp-xylene	2	2.3	2.3	3	3.6	3.6	

Table 8 - Summary of 2007 Sub-slab Vapor VOCs, µg/m^3 (ATC)

VOC	N	Min	p25	p50	p75	Max
Carbon Tetrachloride	5	nd	nd	nd	nd	nd
Trichloroethene (TCE)	5	nd	nd	9.1	44	54
Tetrachloroethene (PCE)	5	8.8	420	1,200	4,100	4,300
1,1,1-Trichloroethane	5	nd	nd	nd	nd	nd
Methylene Chloride	5	nd	nd	nd	nd	nd
Acetone	5	nd	nd	nd	nd	360
2-Butanone (MEK)	5	nd	nd	18	120	240
Chloroform	5	nd	nd	nd	nd	nd
4-Ethyl Toluene	5	59	150	210	460	1,100
Ethylbenzene	5	3.5	15	20	29	370
1,2,4-Trimethylbenzene	5	140	270	450	1,200	1,300
1,3,5-Trimethylbenzene	5	54	120	170	470	590
mp-xylene	5	20	78	100	150	1,700

Table 9 - Summary of 2007-2008 Soil Vapor VOCs, µg/m^3 (ATC)

VOC	N	Min	p25	p50	p75	Max
Carbon Tetrachloride	13	nd	nd	nd	nd	nd
Trichloroethene (TCE)	13	nd	nd	nd	nd	1,200
Tetrachloroethene (PCE)	13	nd	nd	nd	260	490
1,1,1-Trichloroethane	13	nd	nd	nd	nd	nd
Methylene Chloride	13	nd	nd	nd	nd	nd
Acetone	13	nd	nd	24	150	1,400
2-Butanone (MEK)	9	nd	3.5	8.6	12	59
Chloroform	13	nd	nd	1.1	5.4	46
4-Ethyl Toluene	13	nd	nd	23	98	130
Ethylbenzene	13	nd	nd	2.7	28	30
1,2,4-Trimethylbenzene	13	nd	nd	nd	9.8	180
1,3,5-Trimethylbenzene	13	nd	nd	nd	nd	38
mp-xylene	13	nd	nd	nd	nd	140

FE reviewed the results of the ATC soil vapor investigations and found that combined, the sub-slab and soil vapor samples (collectively, soil vapor) show that the highest soil vapor concentrations of PCE, TCE, Xylenes, and BTEX compounds center near the underground storage tanks on the north side of the property and beneath the slab near the northwest corner of the former two-story warehouse/office area. The higher levels of soil vapor are from PCE. Xylene in soil vapor was highest near the former paint spraying booth and xylene tank. The most elevated sub-slab/soil vapor levels coincide with the PCE and cis-1,2 DCE groundwater plumes.

The Site buildings have been removed, the concrete slabs will be removed and the majority of surface soils will be removed as part of the planned redevelopment. Due to the changed conditions, to evaluate current soil vapor conditions and extend coverage in areas not previously sampled by ATC, additional soil vapor sampling was warranted.

2.7.6 Soils and Commercial Use Soil Cleanup Objectives

The Volunteer contemplates development of a commercial warehouse that will require remediation to meet, at a minimum, the NYCRR Part 375-6.8(b) Commercial Use Soil Cleanup Objectives (CUSCOs). At this time, the specific development plans are not finalized; however, it is anticipated that for construction purposes approximately 20 percent of the soil within the planned building footprint area will be excavated four to five feet below grade to accommodate footings. Except for two locations, SB-5 at seven feet bgs and DW-3 at 0.5 feet bgs, soils in all other sampled locations were below the CUSCOs. We anticipate that the soil in these two locations will be removed in the course of normal construction with limited further excavation of hot spots where contamination is deeper.

2.7.7 Data Summary and Initial Conceptual Model

FE's analysis of the 2008 ATC data led us to the conclusion that soils are minimally impacted and that soil contamination above the CUSCOs applicable to the anticipated Site use is limited to a few locations.

The main conclusion from the 2008 data is that groundwater with chlorinated solvents was the matrix that is most impacted. The data suggested a potential PCE DNAPL source area and groundwater plume in the northeast corner of the Site because of the PCE groundwater levels that exceed one percent of the pure phase PCE solubility and a cis-1,2-DCE groundwater plume nearer the center of the property where CVOC degradation appears to have contributed to a plume. CVOC groundwater concentrations were only partially characterized at depth.

Previous soil vapor levels were highest beneath the concrete slab but did not appear to have a material impact inside the former building.

3.0 SAMPLING METHODOLOGY

The SRI occurred in two phases in order to assess conditions after a 12-year period of inactivity and to develop a refined sampling approach after evaluation of the initial sampling results. Phase II sampling targeted the impacted areas identified in Phase I and was designed to characterize and delineate the impacted areas sufficiently to formulate a remediation plan. Figure 2 presents the SRI sampling locations. The approved Supplemental Remedial Investigation Work Plan (SRIWP), and correspondence describing modifications to the SRIWP groundwater sampling locations and number are included as Appendix A.

3.1 Phase I Sampling

Phase I sampling included a geophysical survey, groundwater sampling from existing monitoring wells, soil vapor sampling, ambient air sampling, collection of background air quality data for VOCs and particulates, shallow soil sampling, and a tidal survey. All monitoring wells were redeveloped following the 12-year period of inactivity before sampling. They were then purged prior to sampling.

3.1.1 Geophysical Survey

A Site-wide (3.56-acre) geophysical survey was undertaken to identify USTs, piping, and underground utilities. The survey employed ground penetrating radar, magnetometer, and electromagnetic pipe locator. The initial geophysical survey found no anomalies indicative of USTs, underground piping, or utilities. While it is possible that there are no USTs, there may have been interference due to the concrete slab or other soil factors. While drilling during Phase II, a second, limited geophysical survey focused on areas where USTs were reported earlier and found evidence of USTs in the northeast corner of the property (UST Area). As a result, FE believes there is a strong possibility that USTs remain on Site. A contingency for finding and removing USTs will be included in the RAWP.

3.1.2 Phase I Groundwater Sampling

FE sampled the following monitoring wells as part of Phase I. MW-21 and MW-23, originally slated for sampling, were not sampled because MW-23 could not be located and MW-21 did not provide sufficient water for sample collection, and was likely clogged. The following lists the 13 existing monitoring wells sampled as part of Phase I of the SRI:

Well	Depth	Well	Depth	Well	Depth
MW-1	20	MW-13	8	MW-22	18
MW-2	20	MW-14	15	MW-9	20
MW-3	20	MW-17	18	MW-15	14
MW-6	20	MW-18	18	--	--
MW-8	20	MW-20	18	--	--

FE sampled the existing wells for the following parameters:

- TCL VOCs and STARS List VOCs by EPA Method 8260
- TCL SVOCs by EPA Method 8270
- TAL metals by EPA Method 6010/7000 (filtered and unfiltered)
- Basic groundwater parameters: nitrate, sulfate, sulfide, chloride, alkalinity Fe II, methane, carbon dioxide, Total Organic Carbon, and Total Dissolved Solids
- Two wells, MW-2 and MW-9, were analyzed for TCL pesticides/herbicides and PCBs (Methods EPA Methods 8081/8082)

Emerging Contaminants

One sample in MW-1 was collected for PFAS and 1,4-Dioxane following the recent NYSDEC sampling guidance for these compounds. The purpose of this sampling was to assess whether the low levels of these compounds found in previous sampling at the Site are from an on-Site or off-Site source. The site lies atop a groundwater divide, so there is no upgradient area, per se. MW-1 is close to the eastern Site boundary and was selected for PFAS sampling as it is the Site well best positioned to gauge potential off-Site emerging contaminants.

3.1.3 Phase I Shallow Soil Sampling

Shallow Soil Sampling – Exposed Soil Area

Shallow soil sampling took place in the broken asphalt areas (Exposed Soil Area, Figure 2). The purpose of these samples was to characterize exposed soil, check for spills, and provide information for the exposure assessment. Eight soil samples were collected from one foot below the surface in the northeast portion of the Site and six soil samples were collected from the south central portion. Two shallow sample locations in each of the two areas extended to the water table. All samples were analyzed for the following parameters:

- NYSDEC ASP 2005 TCL volatile organic compounds (VOCs) and STARS List VOCs by EPA Method 8260. Samples for TCL VOCs were collected using an EnCore™ sampler, a volumetric storage chamber that can be filled completely with zero headspace to minimize loss of VOCs. Soil samples for VOC analysis were collected by obtaining 3, 5-gram aliquots of soil per 6-inch sample interval using the EnCore™ samplers. One 60-mL volume of soil will also be collected for each VOC sample for percent solids analysis.

- NYSDEC ASP 2005 TCL semi-volatile organic compounds (SVOCs) by EPA Method 8270.

NYSDEC ASP 2005 Target Analyte List (TAL) metals by EPA Methods 6010/7000.

3.1.4 Soil Vapor Sampling

A total of 17 sub-slab and soil vapor samples were collected throughout the BCP Site to assess potential subsurface vapor conditions. The soil vapor points concentrated in the areas where earlier sampling identified elevated VOCs, but also encompassed locations outside these areas so as to provide Site-wide coverage.

All soil vapor samples were analyzed using EPA Method TO-15. Four ambient air samples were also collected at the same time as the soil vapor sampling to identify potential interferences associated with infiltration of outdoor air into the sampling apparatus. All soil vapor, sub-slab soil vapor and outdoor air samples were collected in general accordance with the NYSDOH's *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October, 2006).*

Vapor Probe Installation

Soil Vapor

Soil vapor samples were collected from seven temporary soil vapor sample points (SVP-10 through SVP-16) installed approximately two feet below grade (ATC in its 2009 reported that groundwater ranges from approximately 4 to 6 feet below grade.) At each sample location, a 1/8 to 1/4-inch -diameter, retractable, decontaminated, stainless steel sampling probe were driven to the sampling interval. The borehole above the sampling probe was sealed with cement-bentonite or equivalent material to prevent ambient air from mixing with soil vapor.

Sub-slab Soil Vapor

Sub-slab soil vapor samples were collected at 10 temporary sample locations (SSV-6 through SSV-15) from beneath the existing concrete slab. An approximate 1-inch hole was drilled through the slab at each location. Inert, 1/4-inch tubing was installed through the slab not to extend more than two inches into the sub-slab material. The implants were sealed to the surface with putty or equivalent material.

Soil Vapor and Sub-slab Soil Vapor Sampling

Vapor samples were collected after the installation of the probes and tubing using laboratory certified 1-liter SUMMA canisters. Prior to collecting a sample, a closed-circuit sampling train was created by attaching the sampling canister via a steam-cleaned, stainless steel manifold. FE employed a tracer gas test (i.e. helium) to ensure quality assurance/quality control and verify the integrity of the probe seal. Once the sampling train passed the tracer

gas test, it was connected to the probe tubing (typically 0.25-inch polyethylene tubing).

Using the same flow rate as were used during sampling, approximately one to three purge volumes were purged from the sample tubing before sampling begins. While sampling, the vacuum of the sample SUMMA canister was used to draw the soil vapor through the flow controller at 0.2 L/minute or less. After sampling, the SUMMA canisters were packaged and sent to a New York State ELAP-certified laboratory under chain-of-custody for TO-15 analysis.

3.1.5 Ambient Air Sampling

Three ambient air samples were collected to investigate Site air quality. The samples were collected in 8-hour SUMMA canisters on January 13 and 14, 2020.

3.1.6 Tidal Survey

FE conducted a tidal survey to gauge the extent of tidal fluctuation on groundwater levels and flow. Continuous water levels (In-Situ Level Troll 700) were recorded at 6-minute intervals for approximately one lunar cycle in monitoring wells MW-1 and MW-14, which lie on either side of the groundwater divide identified by ATC in their 2009 RIR. Tidal measurements were obtained from the USGS tidal measuring gauge in Inwood, New York.

3.1.7 Background Air Quality

A stationary monitoring point near the center of the Site measured background air quality for particulates and VOCs over a 24-hour period on January 8 and 9, 2020 (Phase I) before any invasive work began.

3.2 Phase II Sampling

Phase II sampling consisted of 14 soil borings extending to the putative clay confining layer at approximately 35 feet below grade and collection of soil samples and temporary groundwater samples at intermediate depths between grade and the putative clay confining layer.

In the original SRIWP, the Site was divided into four Areas of Concern (AOC) based on the groundwater results from 2007-2008 ATC sampling results and the physical layout. The Phase I groundwater sampling results found those AOCs to be no longer relevant. Instead, the Phase 2 sampling focused on collecting information from the areas with impacts identified in Phase I. Based on the results of the SRI Phase I, the Site was divided into four areas: (1) Exposed Soil Area, (2) the UST Area in the northeast portion of the Site, (3)

Drywell Area, and (4) Plant Area (Figure 2).

3.2.1 Soil and Temporary Groundwater Sampling Investigation

On a Site-wide basis, a direct-push drill rig advanced the soil borings and collected soil and temporary groundwater samples. All soil borings were advanced to the top of the putative clay confining layer at approximately 35 feet below grade. Continuous soil cores in five-foot-long acetate sleeves were collected, inspected, and logged.

The Site was divided into 900 ft^2 grid cells superimposed over the Site. Borings were placed within the grid cells so as to ensure good coverage in the areas of concern. The actual boring position was based on random coordinates within the grid cells, although some locations are non-random for specific purposes highlighted below. This produces good coverage while introducing a random component that provides unbiased Site characterization. Table 10 presents the rationale for each soil boring/temporary groundwater sampling point.

Table 10 – Soil Boring/Temporary Well Rationale (FE)

Soil Boring/ Temp. Well	Rationale
SB/TMP-1	Characterize UST area, delineate VOC conc. at Site boundary and along depth profile, collect potential treatment data. Delineate impacted VOC boundary. Investigate potential UST impacts to the northwest identified in the Phase I Report.
SB/TMP-2	Characterize UST area, delineate vertical VOC conc. in UST area, collect potential treatment data. Delineate impacted VOC boundary.
SB-TMP-3	Characterize area near MW-1, evaluate vertical VOC conc., collect potential treatment data.
SB/TMP-4	Characterize area near MW-20, evaluate vertical VOC conc., collect potential treatment data
SB/TMP-5	Characterize UST area, evaluate VOC conc. in UST area and along depth profile, collect potential treatment data. Delineate impacted VOC boundary. Investigate potential tank farm impacts to the northwest identified in the Phase I Report.
SB/TMP-6	Collect data to characterize western Site area
SB/TMP-7	Characterize former impacted area, evaluate vertical VOC conc. Collect potential treatment data.
SB/TMP-8	Characterize former impacted area, evaluate vertical VOC conc., collect potential treatment data
SB/TMP-9	Characterize former impacted area, evaluate vertical VOC conc., collect potential treatment data
SB/TMP-10	Characterize area near MW-22, evaluate vertical VOC conc.
SB/TMP-11	Collect data to characterize soil and groundwater in unsampled/under-sampled area of Site
SB/TMP-12	Collect data to characterize soil and groundwater in AOC, assess potential impacts near receptor. Evaluate chlorinated impacts near border,
SB/TMP-13	Collect data to characterize soil and groundwater in UST area. Evaluate vertical VOC conc. Delineate impacted VOC boundary. Investigate potential tank farm impacts to the northwest identified in the Phase I Report.
SB/TMP-14	Collect data to characterize soil and groundwater in UST area. Delineate PCE Solvent boundary. Investigate potential tank farm impacts to the northwest identified in the Phase I Report.

Soil Screening – Site Wide

Soils were field screened using a Photoionization Detector (PID) and described generally using the Unified Soil Classification System along the vertical soil column of each boring. PID readings were recorded on the boring logs along with visual, olfactory, and lithology observations. The PID had a 10.6 eV lamp (TCE has an ionization potential of 9.45 eV and PCE has an ionization potential of 9.32) capable of registering chlorinated VOCs.

Soil Sampling and Analysis – Site Wide

It is contemplated that remediation of the BCP Site will remove, at a minimum, approximately 20 percent of the planned building footprint to prepare the Site for development. (This soil will be sampled separately for disposal purposes.) If warranted, deeper soil may be removed from existing grade to remove hot spots.

All in-ground sampling equipment was decontaminated by thoroughly washing with soap and water and rinsing with potable water before and between sample collection. All soil samples for VOC analysis were collected using EnCore™ samplers to prevent VOC loss during sampling. VOC samples were collected by taking three EnCore™ samples from the 1-foot section of sampled soil section. One 60-mL volume of soil was also collected for each VOC sample for percent solids analysis.

Each soil sample was labeled (e.g., name of boring and sample interval; B-1 (12.5'-13.5'), sealed, and placed in a chilled cooler for shipment to the laboratory. Soil samples were analyzed for NYSDEC ASP 2005 TCL Volatile Organic Compounds (VOCs) and STARS list compounds by EPA Method 8260. Target Analyte Metals were sampled in selected locations. In addition, the soil samples in two borings, SB-10 and SB-5, were analyzed for TCL pesticides/herbicides and PCBs (Methods EPA Methods 8081/8082).

Temporary Groundwater Well Sampling – Site Wide

Groundwater samples were collected from each boring, or a co-located soil boring to collect temporary groundwater samples at specified depths, if necessary, to obtain sufficient sample. The purpose of the temporary groundwater samples was to delineate the groundwater plume both horizontally and vertically.
The temporary groundwater samples were collected by drilling the rods to the desired depth, retracting the rods to expose a 5-foot-long stainless steel screen and collecting the sample using a peristaltic pump to withdraw the groundwater through dedicated high-density polyethylene (HDPE) tubing.

Each temporary groundwater sample was labeled (e.g., name of boring and sample interval; B-1-GW (12.5'-16'), sealed, and placed in a chilled cooler for shipment to the laboratory. Temporary groundwater samples were analyzed for NYSDEC ASP 2005 Target Compound

List (TCL) VOCs with STARS list compounds and naphthalene by EPA Method 8260 and Target Analyte List (TAL) metals. Both filtered and unfiltered samples were collected for metals analysis.

Soil Sampling – UST Area, Plant Area and Drywell Area

In the UST Area, Plant Area, and Drywell Area, from three to five soil samples per boring were collected. The samples were collected from 1-foot intervals in each soil boring at the following depths:

- One sample was collected from the shallow groundwater table, approximately four to five feet below grade to investigate shallow soil conditions where there is a possibility that solvent spills may have collected at the water table interface.
- A second sample was collected from a 1-foot interval immediately above the putative clay layer at approximately 35 feet below grade.
- The third through fifth samples were collected from random one-foot intervals. Random samples are necessary in order to properly identify the contaminated strata and identify intervals of high and low VOC concentrations. In the earlier work by ATC, temporary groundwater samples were collected at specific depth intervals (10 ft., 20 ft., 30 ft., and 35 ft.) but this left data gaps between these intervals and the level of contamination between them unknown. Therefore, random samples were collected at the following depth ranges: one, 1-foot long soil sample from the 7 through 15-ft interval; one, 1-foot sample from the 15 – 25-foot interval, and one, 1-foot sample from the 25 - 34-foot interval.
- If there was a location that exhibited a very high PID reading, then an additional VOC sample was collected from this interval.

In addition to VOCs, soil samples were analyzed for TAL metals (because of spray paint operations), Gasoline Range Organics (GRO) and Diesel Range Organics (DRO). Additional soil samples were collected for bulk density, Total Organic Carbon, Faction of Organic Carbon, and grain size analysis. These samples were collected at the field geologist's discretion.

Temporary Groundwater Sampling - UST Area, Plant Area, and Drywell Area

Temporary groundwater samples in the UST Area, Plant Area, and Drywell Area were collected in each soil boring (or a co-located boring). Up to four temporary groundwater samples were collected in each boring. One temporary groundwater sample was collected near the water table (4-6 feet bgs) and a second above the putative clay layer at 35 feet. The third and fourth samples were collected randomly from any of the seven intervening three-foot sections from approximately 10 feet to 31 feet.

3.2.2 Shallow Soil Sampling – Plant Area and Drywell Area

FE collected five shallow soils samples (designated (SSB) as part of Phase II (Figure 2). The purpose of these samples was to augment the shallow soil samples collected in Phase I, check for spills, and provide information for the exposure assessment. Five continuous soil cores were advanced to the water table in the locations identified on Figure 2. These samples were collected from the 0- to 12-inch interval from the surface or immediately below the paved and/or concrete slab and analyzed for the same parameters as the shallow soils in the Phase I sampling. In two of the borings (field determined), 1-foot soil samples were collected to the water table and analyzed for the same parameters. Two of the samples were analyzed for pesticides/herbicides and PCBs.

3.3 Quality Assurance/Quality Control

All drilling equipment was decontaminated between each soil boring location using a non-phosphate detergent solution. The decontamination process was performed prior to the installation of each soil boring to avoid cross contamination of samples. Duplicate and field blank samples were collected at the rates approved in the SRIWP. Dedicated tubing was used to sample each monitoring well, ensuring that no cross-contamination between the samples occurred.

3.3.1 Chain of Custody

A chain-of-custody was prepared for sample transmittal to the laboratory. The chain-of-custody form accompanied the sample throughout its trip to the laboratory. The chain-of-custody record included a request to the laboratory for sample analysis. On arrival at the laboratory, the sample custodian entered the sample in the laboratory's sample log book. The chain-of-custody is kept on file at the laboratory.

3.3.2 Laboratory Testing

SGS Laboratories, a New York State Environmental Laboratory Approval Program Contract Laboratory Protocol (ELAP CLP)-certified laboratory, was used for all laboratory analysis. The laboratory operates a Quality Assurance/Quality Control (QA/QC) program that consists of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State.

3.3.3 Investigation Derived Waste

All aqueous investigation derived waste (IDW) was placed in DOT-approved 55-gallon steel drums for eventual waste classification testing and removal. In all, the SRI generated 16 drums of liquid waste for disposal. This consists of well re-development water, groundwater purge water, and equipment decontamination waste. The solid waste generated from the

SRI included soil cuttings and PPE: two drums of soil cuttings. Because records indicated that listed wastes (PCE, TCE) had been used at the Site, FE obtained a "Contained-in" determination from NYSDEC, authorizing management of IDW as non-hazardous waste. The drummed IDW will be removed during Site remediation.

3.3.4 Community Air Monitoring Program

Particulates and VOCs in air were measured while advancing soil borings during Phase II of the SRI. One Community Air Monitoring Program (CAMP) station was immediately downwind of the work area while the second monitored air quality at the perimeter nearest the closest residence. Continuous measurements were collected for particulates and VOCs using a Dust Trak Particulate monitor and MiniRae PID monitor.

4.0 FINDINGS

This section presents the findings of the 2020 SRI, and the results of soil, groundwater, and soil vapor sampling. It includes a description of the stratigraphy and groundwater flow direction and tidal influences.

The 2008 ATC investigation results of metals in soils and sludge have been combined with the 2020 SRI results because metals concentrations are not expected to change over time. This provides more data, better coverage, and incorporates the data from the drywells and soils that ATC sampled in 2008 and earlier. All other results are from the 2020 SRI only.

Figure 5 shows soil concentrations above the Part 375 Soil Cleanup Objectives. Figure 6 shows groundwater concentrations above TOGS GA AWQS. Figure 7 depicts PCE, TCE, vinyl chloride, and xylenes above TOGS GA AWQS in the temporary groundwater sampling points. Table 11 presents the soil analytical results for the SRI. Table 12 presents the groundwater analytical results for the SRI. All laboratory data deliverable reports are included as Appendix B. Boring logs are included as Appendix C. Groundwater purge logs are included as Appendix D.

Initially, in the SRIWP, the Site was divided into four areas for investigation based on the 2008 ATC results: (1) Solvent Plume Area, (2) Chlorinated VOC Degradation, (3) Exposed Soil Area, and (4) General Site Area. Given that conditions have substantially changed since then, the Site was divided into four areas that better reflect current Site conditions. Based on the SRI results, the Site has been sub-divided into four new logical or feature-based areas:

1. **Exposed Soil Area**—Consists of two non-contiguous areas of broken asphalt, one in the northeast corner of the Site and the other in the southern portion. These areas encompass the 14 shallow soil samples collected as part of Phase I of the SRI and extend from 1 to 4.5 feet below grade, and one ATC sample for metals at five feet below grade. There are no groundwater results for this area as it consists of shallow soils only.

2. **UST Area**—The area encompasses the underground storage tanks in the northeast corner of the Site and former spray painting/drying areas and includes soil borings/temporary groundwater samples from SB-1, SB-2, SB-5, SB-13, and SB-14. It includes monitoring wells MW-3, MW-6, and MW-2 and the 2008 ATC soil samples for metals.

3. **Drywell Area**—The area encompasses the drywells on the western portion of the Site. In includes the soil and sludge drywell samples collected by ATC in 2008, soil borings/temporary groundwater samples from SB-11 and SB-12, monitoring wells MW-8, MW-9, MW-13, MW-15, MW-15. It includes shallow soil borings SSB-1,

SSB-2, SSB-3, and SSB-4.

4. **Former Plant Area**—The area encompasses the space within the former plant building. It encompasses borings/temporary groundwater samples from SB-3, SB-4, SB-6, SB-7, SB-8, SB-9, and SB-10. It includes monitoring wells MW-1, MW-17, MW-18, MW-20, and MW-22, and includes shallow soil boring SSB-5. Includes ATC soil samples for metals.

4.1 Stratigraphy

Site soils generally follow a trend of normal to reverse grading with depth, meaning that from the ground surface to approximately 11 to 15 feet below grade, sediments gradually become coarser. From 11 to 15 feet below grade to 35 feet below grade, sediments gradually become finer. This change in grading occurs around 11 to 15 feet below grade. This grading is characterized by surface soils consisting of non-plastic, medium to fine sands that range from 5 to 10 feet thick (0 - 15 ft.), underlain by non-plastic, sub-rounded to rounded, pebble-sized gravels that range from 1 to 4 feet in thickness (11 - 16 ft.). These gravels occur in medium to coarse sand matrices. Below this layer of gravel, the soil texture changes to fine sands and silty/clayey sands with depth. Some finer and more plastic, silt- and clay-rich lenses occur variably across the Site, generally occurring above or below gravels and around 25 to 30 ft. below grade. In contrast to ATC, although soils generally become finer with depth, and there are silty and clayey strata at depth, FE did not observe a continuous clay layer at 35 ft. below grade. While there is no continuous clay stratum at depth, the larger percentage of clay and silt at depth and overlapping lenses of fine-textured soils make it less likely that flow will cross this layer.

Directionally, from north to south, clay and silt lenses alternate from north to south, from approximately 11 to 15 ft. and from 25 to 34 ft. These lenses show no continuity between borings, alluding to these lenses trending laterally in an east-west direction. From west to east, soil trends appear to be finer on the western side of the Site toward Jamaica Bay, with thicker clay and silty clay layers occurring from approximately 12 to 16 ft. and from 24 to 30 ft. The western side of the Site contains less gravel as well, with only a thin sheet of gravel (0.25 feet thick) observed in SB-11. Conversely the eastern side of the Site consists of coarser grained sediment layers with thicker bands of gravels (2 - 4 ft.) occurring in SB-7 and SB-8. Stratigraphic cross-sections are included in Figure 3.

4.2 Groundwater Flow

Regional groundwater flow in the water table aquifer is west towards the end of the peninsula on which the Site sits (USGS Water Supply Paper 2498, *Water-table configuration,* plate 3, 1999). Upon reaching the Site, groundwater diverges with a component flowing northwest towards Negro Bar Channel and a component flowing southeast towards Motts Basin.

On Site, a groundwater divide forms a west-southwest east-northeast oriented hydraulic feature along a line between MW-15 and MW-6 (Figure 4). Based on the wider contour intervals towards the south, less mechanical energy is required to move groundwater in this direction so the bulk of the groundwater flow is to the south. Hydraulic conductivity measurements made by ATC in 2007/2008 ranged from 4.2 x 10^{-5} cm/sec to 5.3 x 10^{-4} cm/sec and averaged 2.3 x 10^{-4} cm/sec in eight measurements.

4.3 Soil and Groundwater Analytical Results

The main Site contaminants of concern are chlorinated VOCs, non-chlorinated VOCs in a localized area, and metals to a much lesser extent in drywells. The results section focuses on these constituents. FE also conducted limited soil sampling for pesticides and PCBs in shallow soil borings (0 to 5 feet) SSB-2, SSB-4, SSB-5, and in deep boring SB-11. In total, 10 samples (including one duplicate sample) were collected for these compounds. Recall the Site is on a peninsula surrounded by salt water

4.3.1 Overall Site

Before discussing the four areas into which the Site has been divided, it is helpful to discuss the findings of the less important compounds.

PCBs were below detection limits in all 10 soil samples. All pesticides in 10 soil samples were below detection limits except for one result in SB-11 (18-19) at a concentration of 1.9 µg/kg, which is below Unrestricted Use Soil Cleanup Objective of 3.3 µg/kg.

Twenty one soil samples were collected for SVOCs at depths from zero to 4.5 feet below grade. Most SVOCs were below detection limits. SVOCs modestly above the URSCOs and RRSCOs included benzo(a)anthracene, benzo(b)fluoranthene, and 1,2,3-indeno(cd)pyrene in sample HA-9 (1-2 ft). All other SVOC sample results were below the URSCO soil criteria. All SVOCs were below the CUSCOs. Seven soil samples outside the Exposed Soil Area were analyzed for SVOCs: SSB1 (0-1), SSB2 (0-1), SSB2 (4-5), SSB3 (0-1), SSB4 (0-1), SSB4 (4-5), and SSB5 (0-1).

4.3.2 Exposed Soil Area

VOCs in the Exposed Soil Area were nearly all below detection limits. Detected concentrations included chloroform, methylene chloride, and PCE. All VOC concentrations were below the URSCOS.

Fourteen soil samples were collected for SVOCs at depths from zero to 4.5 feet below grade. Most SVOCs were below detection limits. SVOCs slightly above the URSCOs and RRSCOs included benzo(a)anthracene (1,070 µg/kg), benzo(b)fluoranthene (1,060 µg/kg), and 1,2,3-

indeno(cd)pyrene (584 µg/kg) in sample HA-9 (1-2 ft). All SVOCs were below the CUSCOs.

All metals samples were below the URSCOs except for lead in sample HA-9 (1-2) at a concentration of 112 mg/kg, which is above the URSCO of 63 mg/kg and below the RRSCO and CUSCO of 400 mg/kg, each, and zinc at 134 mg/kg in the same sample.

4.3.3 Drywell Area

The Drywell Area consists of the nine drywells on the western side of the Site.

4.3.3.1 Drywell Area Soils

Most VOCs compounds were below detection limits in the Drywell Area. In the 11 samples collected, detected VOCs included acetone; carbon disulfide; cis,1,2-DCE; n-propylbenzene; PCE, TCE, 135-trimethylbenzene, and xylenes. The results for these compounds ranged from <1 µg/kg to approximately 39 µg/kg, and all were below the URSCOs.

Table 13 presents a data breakdown for soil and sludge samples in the Drywell Area. Most metals results, 75 percent, are non-detect or close to their URSCOs, and the median concentrations are either non-detect or below 4 mg/kg. The highest concentrations occur in lead, copper, chromium, and zinc. Results above the URSCOs, RRSCOs, and CUSCOs are all sludge samples from drywells DW-1 through DW-9 at depths of 0.5 ft. or eight feet that were collected by ATC in 2009 and earlier. Drywells DW-1 through DW-9 each had one or more metals above the URSCOs; All drywells but DW-1, DW-4, and DW-5 had one or more metals above the RRSCOs; and for CUSCOs, DW-2, DW-3, DW-8, and DW-9 had one or more metals above the CUSCO. DW-3 had the most metals, followed by DW-2, DW-6, and DW-9. Lead most often exceeded the CUSCOs, followed by arsenic, cadmium, mercury, and chromium. Where soil and sludge samples were analyzed for the same metals (arsenic, mercury, cadmium, lead, chromium, and selenium), the median concentrations for all metals was higher in the sludge samples than in the soil samples.

Table 13 – Drywell Area Metals Summary, 2020, mg/kg (FE)

Metal	No. Obs.	Min	p25	p50	p75	Max	URSCO	RRSCO	CUSCO
Arsenic	30	nd	nd	2.8	4.5	17	13	16	16
Mercury	30	nd	nd	nd	0.21	4.1	0.18	0.81	2.8
Cadmium	18	nd	nd	1.5	4.1	29	2.5	4.3	9.3
Lead	30	nd	nd	2.2	327	1,730	63	400	1,000
Copper	13	nd	nd	nd	nd	370	50	270	270
Chromium	30	1.7	2.6	3.2	35	286	30	180	1,500
Nickel	13	nd	nd	nd	nd	37	30	310	310
Silver	9	nd	nd	nd	nd	3	2	180	1,500
Selenium	18	nd	nd	nd	nd	9.5	3.9	180	1,500
Zinc	13	nd	nd	nd	20	520	109	10,000	10,000

4.3.3.2 Drywell Area Groundwater

Groundwater in the Drywell Area was monitored in wells MW-8, MW-9, MW-13, and MW-14. VOCs in groundwater were all below detection limits in the samples from these wells.

The only filtered heavy metal detected in groundwater in this area was arsenic in MW-13 at a concentration of 5 µg/L, which is below the TOGS GA AWQS of 25 µg/L. Iron, manganese, and sodium were above their TOGS criteria, but these are considered as derived from natural sources and also influenced by the Site being on a peninsula that is surrounded by Jamaica Bay, a salt water body.

4.3.4 UST Area

The UST Area encompassed the cluster of USTs in the northeast portion of the Site and the surrounding area.

4.3.4.1 UST Area Soils

VOCs

Most soil VOCs were below detection limits in this area. Detected soil VOCs are either chlorinated or non-chlorinated solvent mixtures and the concentrations for most samples are less than 3,000 µg/kg. Table 14 summarizes the data breakdown for the principal detected VOCs.

Table 14 – UST Area VOCs Summary, 2020, µg/kg (FE)

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Xylenes	26	nd	nd	nd	179	7,060	354,000	260	100,000	500,000
1,3,5-Trimethylbenzene	26	nd	nd	nd	37	632	37,500	8,400	52,000	109,000
n-propylbenzene	26	nd	nd	nd	51	1,930	34,100	3,900	100,000	500,000
Ethylbenzene	26	nd	nd	nd	58	1,370	72,000	1,000	41,000	390,000
Toluene	26	nd	nd	0.38	4.1	399	6,150	700	100,000	500,000
Tetrachloroethene	26	nd	nd	1.2	809	2,810	7,330	1,300	19,000	150,000
Trichloroethene	26	nd	nd	nd	100	581	892	470	21,000	200,000
cis 1,2-dichloroethene	26	nd	nd	3.6	44	101	264	250	100,000	500,000

The principal non-chlorinated VOCs above the URSCOs include ethylbenzene, n-propylbenzene, toluene, 1,3,5-trimethylbenzene, and xylenes at depths of 14 feet below grade or shallower. The only non-chlorinated VOCs above the RRSCOs were ethylbenzene (72,000 µg/kg) and xylenes (354,000 µg/kg), both from SB-5 at 7 feet below grade. All VOCs were below the CUSCOs.

The principal chlorinated VOCs above the URSCOs include PCE, and TCE at depths greater than 26 feet below grade. One cis,1,2-DCE soil result at 14 feet below grade exceeded the URSCO. All chlorinated VOCs in soils were below the RRSCOs and CUSCOs.

Metals

Metal soil concentrations in the UST Area, 75 percent, are below the URSCOs. Of the 28 soil samples collected in this area, arsenic, lead, chromium, and zinc exceeded the URSCOs. Only arsenic exceeded the RRSCO and CUSCO. Table 15 summarizes the metal concentrations for metals above the Part 357 SCOs. Most metal concentrations are below the URSCOs for each metal.

Table 15 – UST Area Metals Summary, 2008 & 2020, mg/kg (ATC & FE)

Metal	No. Obs.	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Arsenic	28	nd	3	6.7	9.6	16	19	13	16	16
Lead	28	nd	2.9	4.8	8.3	78	139	63	400	400
Chromium	28	3.5	8.3	13	21	38	46	30	180	1,500
Zinc	28	6.2	20	29	47	145	161	109	10,000	10,000

Arsenic exceeded the URSCO in three samples: SB-13 (28-29), 15.5 mg/kg; SB-14 (29-30, 15.1 mg/kg; and SB-5 (10-11), 18.5 mg/kg. Lead and zinc were above the URSCO at 5 feet in two samples (ATC sample B-7 and B-14). Chromium slightly exceeded the URSCO at depths from 26 to 30 feet in three samples: SB-1 (25-26), 38.4 mg/kg; SB-13 (28-29) 46.2 mg/kg; and SB-14 (29-30) 30.3 mg/kg; and zinc exceeded the URSCO in SB-14 (29-30), 145 mg/kg. Arsenic was above the RRSCO and CUSCO in one sample, SB-5 (10-11), 18.5

mg/kg.

Boring SB-5 was the only location in the UST Area where VOCs and metals exceeded the RRSCOs. These were in samples SB-5 (6-7) and SB-5 (10-11) for ethylbenzene, xylenes and arsenic.

4.3.4.2 UST Area Groundwater

Groundwater was sampled using existing monitoring wells and temporary groundwater sampling points at various depths. All have been combined in this description of groundwater conditions.

VOCs

Most of the principal contaminant VOCs in groundwater were above TOGS GA AWQS in the UST Area. Table 16 summarizes the data breakdown for the principal groundwater VOCs in the UST Area.

Table 16 – UST Area Groundwater VOCs Summary, 2020, µg/L (FE)

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Xylenes	26	nd	nd	1,455	6,630	45,700	48,700	5
1,3,5-Trimethylbenzene	26	nd	nd	38	219	1,490	1,510	5*
n-propylbenzene	26	nd	nd	51	514	1,120	1,340	5*
Ethylbenzene	26	nd	1.8	267	1,830	7,920	9,470	5
Toluene	26	nd	nd	55	554	16,100	21,800	5
Tetrachloroethene (PCE)	26	nd	nd	9.4	93	3,050	7,610	5
Trichloroethene (TCE)	26	nd	nd	1.1	53	2,650	5,440	5
cis-1,2-DCE	26	nd	1.3	11	169	2,650	3,510	5
Vinyl chloride	26	nd	nd	nd	nd	73	107	2

* Guidance value

Xylenes ranged from non-detect to 48,700 µg/L. The highest xylene concentrations were typically at depths of 15 feet or less, predominantly in temporary wells TMP-13, TMP-5, and TMP-14. The median xylene concentration in this interval is 6,040 µg/L. Below 15 feet, the median concentration is 594 µg/L. Concentrations above one percent of the xylenes pure phase solubility (1,980 µg/L) suggest possible Non-aqueous Phase Liquid (NAPL). Most of these are at 15 feet or less, although at TMP-5 they extend to 20 feet.

The chlorinated solvents PCE and TCE ranged in concentration from non-detect to 7,610 µg/L and non-detect to 5,440 µg/L, respectively. PCE and TCE concentrations are almost exclusively in the single and double digits in the interval above 30 feet and increase abruptly between 30 to 35 feet where the highest concentrations occur (Figure 7). Only three samples had PCE concentrations above one percent pure phase solubility (2,000 µg/L) indicative of

possible Dense Non-aqueous Phase Liquid (DNAPL). These include TMP-1 (30-35) 2,020 µg/L, TMP-2 (30-35) 3,050 µg/L, and TMP-13 (30-35) 7,610 µg/L. TCE follows a pattern similar to PCE, although the concentrations are lower and TCE levels do not approach the one percent solubility threshold for this compound.

There is evidence of natural degradation of chlorinated compounds. The VOCs cis 1,2-DCE and vinyl chloride occur in many samples and appear coincident with the highest PCE and TCE concentrations at 30 to 35 feet.

Metals

Of the 26 filtered metals samples in the UST Area, the only detected heavy metals were arsenic, lead and nickel. The maximum filtered concentrations for these metals were 8.2 µg/L, 8.9 µg/L, and 14.2 µg/L, respectively. All of these were below their TOGS GA AWQS. Unfiltered metals results are in Appendix B.

4.3.5 Former Plant Area

The former Plant Area includes the former plant/warehouse and adjacent areas.

4.3.5.1 Former Plant Area Soils

VOCs

The majority of soil VOCs were below detection limits in this area. Detected soil VOCs are chlorinated solvents and Toluene, and the concentrations for most samples are less than 150 µg/kg. Table 17 summarizes the data breakdown for the principal detected VOCs.

Table 17 – Former Plant Area Soils VOCs Summary, 2020, µg/kg (FE)

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Xylenes	29	nd	nd	nd	nd	nd	nd	260	100,000	500,000
1,3,5-Trimethylbenzene	29	nd	nd	nd	nd	nd	nd	8,400	52,000	109,000
n-propylbenzene	29	nd	nd	nd	nd	nd	nd	3,900	100,000	500,000
Ethylbenzene	29	nd	nd	nd	nd	nd	nd	1,000	41,000	390,000
Toluene	29	nd	nd	nd	0.79	3.5	4.2	700	100,000	500,000
Tetrachloroethene (PCE)	29	nd	nd	nd	4.5	43	2250	1,300	19,000	150,000
Trichloroethene (TCE)	29	nd	nd	nd	2	62	140	470	21,000	200,000
cis-1,2-DCE	29	nd	nd	nd	7.8	107	122	250	100,000	500,000
Vinyl chloride	29	nd	nd	nd	nd	4.8	10	260	100,000	500,000

The results for most VOCs in soils in the Former Plant Area are below detection limits or are at very low concentrations. Of the VOCs, the only compound above the URSCO in the

Former Plant Area was PCE in SB-10 at 26 – 27 ft. bgs at 2,250 µg/kg. All other compounds were below the URSCOs, RRSCOs, and CUSCO.

Metals

Metal soil concentrations in the Former Plant Area are extremely low. Of the 30 soil samples collected in this area, arsenic and chromium exceeded the URSCOs. Only arsenic exceeded the RRSCO and CUSCO. Table 18 summarizes the metal concentrations for metals with concentrations above the Part 357 SCOs. Most metal concentrations are below the URSCOs for each metal.

Table 18 – Former Plant Area Soil Metals Summary, 2020, mg/kg (FE)

Metal	No. Obs.	Min	p25	p50	p75	p95	Max	URSCO	RRSCO	CUSCO
Arsenic	30	nd	2.4	4.4	8	17	17	13	16	16
Lead	30	nd	nd	3.8	7.4	13	16	63	400	400
Chromium	30	2.8	4.2	8.8	20	30	47	30	180	1,500
Zinc	30	nd	9.9	23	34	55	63	109	10,000	10,000

Arsenic exceeded the URSCO, RRSCO, and CUSCO in two samples, SB-3 (15-16) and SB-4 (34-35). Chromium exceed the URSCO twice at different depths in SB-7 at (13-14) and (34-35). No other metals exceeded the URSCOs, RRSCOs or CUSCO. Metals in shallow boring SSB-5 (0-1) were largely non-detect.

4.3.5.2 Former Plant Area Groundwater

Groundwater was sampled using existing monitoring wells and temporary groundwater sampling points at various depths. These media have been combined in the description of groundwater conditions.

VOCs

Contaminants that exceeded TOGS GA AWQS in the Former Plant Area were largely comprised of the chlorinated solvent PCE and its by-products TCE, cis-1,2-DCE and Vinyl Chloride. PCE, TCE, cis-1,2-DCE and Vinyl chloride concentrations ranged from non-detect to 376 µg/L, non-detect to 780 µg/L, non-detect to 4,750 µg/L, and non-detect to 461 µg/L, respectively. Approximately half of all samples from the Former Plant Area exceed the TOGS GA AWQS for TCE, cis-1,2-DCE and Vinyl chloride, most of which occur at a depth of 15 ft. bgs or lower. Approximately 35 percent of the PCE samples exceed the TOGS GA AWQS. The progressive increase in concentration of the cis-1,2-DCE and Vinyl chloride daughter products suggests that natural degradation is occurring on-Site.

The only non-chlorinated solvent to exceed the TOGS GA AQWS was Xylene, which ranged

from non-detect to 11 µg/L. However, 95 percent of Xylene samples collected from the Former Plant area were non-detect. Table 19 summarizes the groundwater VOCs in the Former Plant Area.

Table 19 – Former Plant Area Groundwater VOCs Summary, 2020, µg/L (FE)

VOC	No. Obs.	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Xylenes	37	nd	nd	nd	nd	9	11	5
1,3,5-Trimethylbenzene	37	nd	nd	nd	nd	0.72	0.91	5*
n-propylbenzene	37	nd	nd	nd	nd	nd	nd	5*
Ethylbenzene	37	nd	nd	nd	nd	2	2.1	5
Toluene	37	nd	nd	nd	nd	nd	1	5
Tetrachloroethene (PCE)	37	nd	1.1	11	89	352	376	5
Trichloroethene (TCE)	37	nd	nd	11	95	619	780	5
cis-1,2-DCE	37	nd	0.94	6.6	269	1,970	4,570	5
Vinyl chloride	37	nd	nd	nd	33	132	461	2

Metals

Of the 36 filtered metals samples in the Former Plant Area, the only detected heavy metals were arsenic, chromium and zinc. The maximum filtered concentrations for these metals were 5.2 µg/L, 14 µg/L, and 27 µg/L, respectively. All of these were below their TOGS GA AWQS. Table 20 summarizes the filtered groundwater metals in the Former Plant Area.

Table 20 – Former Plant Area Filtered Metals Summary, 2020, µg/L (FE)

Metal	No. Obs	Min	p25	p50	p75	p95	Max	TOGS GA AWQS
Arsenic	36	nd	nd	nd	nd	nd	5.2	25
Lead	36	nd	nd	nd	nd	nd	nd	25
Chromium	36	nd	nd	nd	nd	10	14	50
Zinc	36	nd	nd	nd	nd	25	27	100

4.4 Soil Vapor Analytical Results

Seventeen soil vapor samples were collected throughout the entire Site footprint (there are no Site buildings). Of the 69 VOC compounds analyzed by TO-15, 49 percent (34/69) of all results were below detection limits. The breakdown of the soil vapor dataset for the chlorinated VOCs and their degradation by-products is summarized in Table 21. Figure 8 shows the PCE and TCE soil vapor concentrations. The complete soil vapor and ambient air results are included in Table 22.

Table 21 – Soil Vapor Results Summary, 2020, µg/m^3 (FE)

Soil Vapor VOCs	No. Obs.	Min	p25	p50	p75	Max	NYSDOH Soil Vapor Guidance Value
Methylene Chloride	17	1.7	2.1	3.1	4.9	21	60
Tetrachloroethene (PCE)	17	nd	0.14	1.5	14	548	30
Trichloroethene (TCE)	17	nd	0.04	0.45	3.4	55.4	2
Carbon Tetrachloride	17	nd	nd	nd	nd	nd	
Chloroform	17	nd	nd	nd	nd	nd	
Chloromethane	17	nd	nd	nd	nd	0.91	
1,2-Dichloroethane	17	nd	nd	nd	nd	3.6	
1,1-Dichloroethene	17	nd	nd	nd	nd	nd	
1,1-Dichloroethane	17	nd	nd	nd	nd	nd	
cis-1,2-Dichloroethene	17	nd	nd	nd	nd	nd	
Vinyl Chloride	17	nd	nd	nd	nd	nd	
Acetone	17	7.1	42.3	54.6	73.9	375	
2-Butanone (MEK)	17	nd	1.4	2	2.6	10	

PCE and TCE data summaries computed using Regression on Order Statistics (ROS) to account for non-detects.

The results for most of the VOCs in Table 19 are below detection limits or are at very low concentrations. Of the detected compounds, the maximum methylene chloride soil vapor concentration is well below the NYSDOH soil vapor action guidance value of 60 µg/m^3. For PCE, the VOC with the historic highest groundwater concentrations, all but three of the 17 sample locations had results below the NYSDOH soil vapor action guidance value of 30 µg/m^3. The samples above this guideline were SSV-9 (43 µg/m^3), SSV-13 (111 µg/m^3), and SSV-10 (548 µg/m^3). These are on the eastern side of the Site and the two highest values are near the Site's eastern boundary.

For TCE, five of the 17 soil vapor sample results were above the NYSDOH soil vapor action guidance value of 2 µg/m^3. The samples were SSV-8 (6.4 µg/m^3), SSV-12 (3.4 µg/m^3), SSV-9 (12 µg/m^3), SSV-13 (53.7 µg/m^3), and SSV-10 (55.4 µg/m^3). These are on the eastern side of the Site and the two highest values are near the eastern Site border and coincide with the highest PCE soil vapor concentrations. Other than these locations, the balance of the Site had PCE and TCE soil vapor concentrations below the NYSDOH soil vapor action threshold values (Figure 8). These low concentrations are likely due to natural degradation.

Acetone was detected in all soil vapor samples and 2-Butanone (Methyl Ethyl Ketone [MEK]) detected in all but one of the 17 soil vapor samples. Acetone concentrations ranged from approximately 7 µg/m^3 to 375 µg/m^3 and MEK ranged from non-detect to 10 µg/m^3; but both compounds were below detection limits in all 13 (incl. duplicate) SRI Phase I monitoring well groundwater samples. MEK was non-detect in all 54 temporary groundwater samples and acetone was non-detect in more than 90 percent of these samples. They were also below detection limits in all 14 shallow soil samples above the water table. Their near complete absence in these media coupled with their near 100 percent detection in soil vapor samples

suggests that natural degradation processes may be producing these compounds.

Fowler, Thompson and Mueller 2011 note that acetone and MEK can result from microbial degradation or abiotic degradation of organic compounds as metabolic intermediates. They note that many bacterial and yeast species can convert carbohydrates, volatile fatty acids, and alcohols into solvents such as acetone and MEK and have observed production of acetone and MEK on sites contaminated with chlorinated solvents.

From a statistical perspective, the soil vapor data show a moderately strong association between acetone and MEK (Kendall's tau = 0.5662) with strong statistical significance (p-value = 0.0016) in soil vapor.[1] There is a moderate correlation between acetone and PCE that is also statistically significant (Kendall's tau = 0.3603, p-value = 0.04087).[2] Since there is a relationship between acetone and MEK signifying probable natural degradation and since there is a significant association between acetone and PCE[3], then when combined with the absence of PCE in shallow soil and groundwater, this correlation seems to support the idea of natural degradation of PCE in soil vapor.

The two soil vapor points with the highest PCE and TCE concentrations (SSV-10 and SSV-13) on the extreme eastern side suggest a possible surface spill as the PCE and TCE soil vapor concentrations are markedly higher in these locations compared to anywhere else. Soil vapor concentrations for both compounds decrease with increasing distance from these soil vapor points exhibiting a characteristic halo effect associated with VOCs in soil vapor. This behavior also supports the idea of a localized surface release near these locations.

4.5 Ambient Air Analytical Results

Three ambient air samples were collected during the soil vapor sampling. These were co-located with soil vapor sampling locations at the same time. Of the 69 VOC compounds analyzed by TO-15, 65 percent (45/69) were all below detection limits. Of the detected compounds, the highest detected concentration was acetone at 11 $\mu g/m^3$. The data distribution among the chlorinated VOCs and their degradation by-products are summarized in Table 23.

[1] Kendall's tau measures correlation, the degree of association, between parameters. The correlation value for Kendall's tau is approximately 0.2 less than Pearson's R. Thus, 0.0552 is more like 0.77 and 0.3603 is more like 0.56.
[2] This association does not hold for MEK and PCE.
[3] There is also a moderate Kendall's Tau correlation (Kendall's tau = 0.3824) between acetone and TCE that is statistically significant (p-value = 0.02297).

Table 23 – Ambient Air Results Summary, 2020, µg/m^3 (FE)

Ambient Air VOCs	No. Obs.	Min	p25	p50	p75	Max
Methylene Chloride	3	0.45	0.45	0.63	0.73	0.73
Tetrachloroethene (PCE)	3	0.35	0.35	0.42	0.95	0.95
Trichloroethene (TCE)	3	nd	nd	0.11	0.14	0.14
Carbon Tetrachloride	3	0.41	0.41	0.41	0.43	0.43
Chloroform	3	nd	nd	nd	nd	nd
Chloromethane	3	0.97	0.97	1	1.1	1.1
1,2-Dichloroethane	3	nd	nd	nd	nd	nd
1,1-Dichloroethene	3	nd	nd	nd	nd	nd
1,1-Dichloroethane	3	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	3	nd	nd	nd	nd	nd
Vinyl Chloride	3	nd	nd	nd	nd	nd

The concentrations are below detection limits or are very low, less than 1.5 µg/m^3. The maximum ambient air concentration for TCE (0.14 µg/m^3), the VOC with the lowest NYSDOH action threshold, is well below its threshold guidance level of 2 µg/m^3.

4.6 Geophysical Survey Results

The initial geophysical survey found no anomalies indicative of USTs, underground piping, or utilities. While it is possible that there are no USTs, there may have been interference due to the concrete slab or other soil factors. While drilling during Phase II, a second, limited geophysical survey focused on areas where USTs were reported earlier and found evidence of USTs in the northeast corner of the property (UST Area). As a result, FE believes there is a strong possibility that USTs remain on Site. A contingency for finding and removing USTs will be included in the RAWP.

4.7 Tidal Survey Results

The Site is located in the middle of a peninsula extending into Jamaica Bay from the east (Figure 1). North of the peninsula is an arm of Jamaica Bay referred to on the USGS topographic map as Negro Bar Channel. On the south side of the peninsula lies a second arm of Jamaica Bay known as Motts Basin. The surrounding water forms a groundwater divide that runs through the Site with a portion flowing northwest and a portion flowing southeast to the Jamaica Bay inlets on either side of the Site.

Cyclic groundwater level fluctuations were monitored using water-level loggers (In-Situ Level Troll 700) in MW-14 and MW-1 to evaluate tidal effects on groundwater levels. These wells were selected because they lie on either side of the groundwater divide (MW-14 on the north and MW-1 on the south). MW-14 is approximately 460 feet from Jamaica Bay on the north and MW-1 lies approximately 740 feet. Tidal fluctuations were gauged using the data from the USGS tidal monitoring station at Inwood, which measures water levels in Jamaica Bay near the Site. The USGS tidal gauge is approximately 750 feet north of the Site

boundary. Negro Bar Channel is approximately 450 feet north of the Site and MW-14. Motts Basin lies approximately 730 feet to the south. The monitoring period covered one lunar cycle, from January 9, 2020 to February 10, 2020. Water levels were recorded in 6-minute intervals.

In coastal areas, groundwater levels respond to tidal fluctuations. As the tide rises or falls, a sinusoidal wave propagates through the water-bearing regime. The amplitude of each wave decreases and the time lag increases as the distance from the groundwater-surface water boundary increases (Gibbs & Hill, Inc. 1984, p. 43. Todd, 1980, p. 242).

Daily tidal water level differences between low and high tides measured at USGS Inwood Gauging Station ranged from 4.04 feet to 8.34 feet and averaged 6.35 feet. In MW-14, water level fluctuations ranged from 0.10 ft. to 0.86 ft. and averaged 0.20 ft. In MW-1, water levels ranged from 0.02 ft. to 0.34 ft. and averaged 0.08 ft.

Daily Minimum, Maximum, and Average Water Level Differences with Tidal Change, 2020, (ft.) (FE)

Location	No. Obs.	Min	Max	Average	Avg. Tidal Efficiency[1]
USGS Tidal Gauge	31	4.04	8.34	6.34	1.0
MW-14	30	0.10	0.86	0.20	0.03
MW-1	30	0.02	0.34	0.08	0.01

[1] Unitless

The range ratio or tidal efficiency, the ratio of the high-low water level range in a well compared to the water level range in the tide, measured 0.03 in MW-14 and 0.01 in MW-1. These values are consistent with the ranges observed by ATC in 2007 (0.06 and 0.19) and signify that although Site groundwater levels respond to tidal changes, the magnitude of the water level fluctuations is small. These changes are unlikely to have any material effect on groundwater movement or contaminant transport. Figure 9 compares the water level fluctuations in the tidal gauge to MW-1 and MW-14 during the monitoring period.

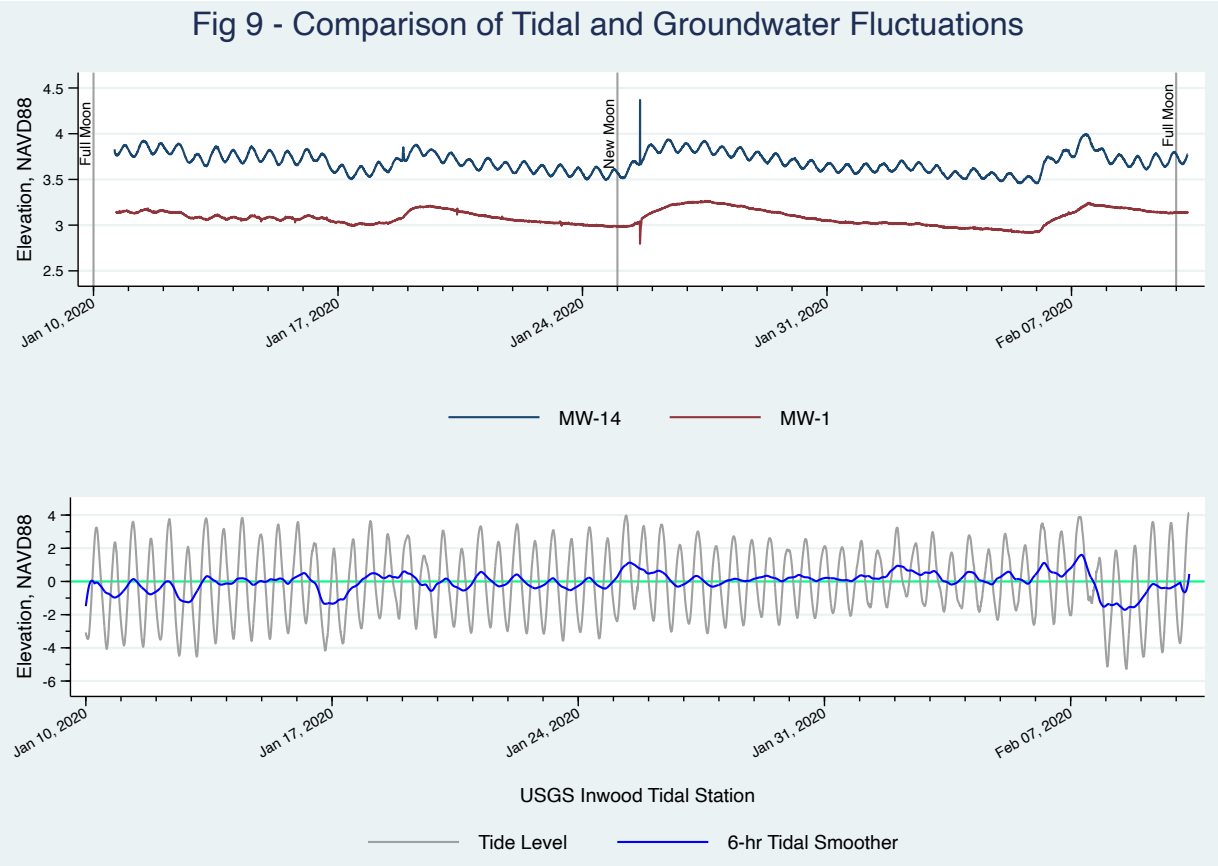


Figure 9 shows Site water levels responding to tidal changes, albeit at much smaller magnitudes (0.1 to 0.86 ft. in MW-14 and 0.02 to 0.34 ft. in MW-1). MW-1, approximately 280 feet further south from Jamaica Bay than MW-14, shows a smaller response, which is consistent with what is expected with increasing distance from the coastal water body. The Site wells show water levels apparently responding with the moon phase and mirroring one another, but at different amplitudes.

As noted, there is a time lag between tidal fluctuations and water level responses in groundwater at a distance from the surface water-groundwater contact (the coast). Based on equation 8.11 in Fetter 2001, the estimated time for a tidal water level changes to influence groundwater levels in the closest Site well is estimated from less than 35 hours to just under 110 hours, depending on the storativity of the unconfined water bearing regime. This is based on distance of 450 feet from the coast to MW-14, storativity values of 0.01 and 0.1 because the actual value is unknown, the average Transmissivity reported by ATC in its 2009 report (2.1×10^{-5} m^2/sec), and a tidal period (the time to go from one extreme to another) of 6 hours.[4] Ultimately, tidal fluctuations seem to have little or no material effect on Site groundwater movement and water levels. Given the small tidal influence and groundwater flow direction,

[4] Storativity range from 0.01 to 0.3 in unconfined water-bearing regimes according to Kruseman and deRitter, 2000, p. 23. The values of 0.01 and 0.1 were used to derive estimates of the time for tidal influences to reach the site as we considered this an acceptable range for this site. The tidal period can range from less than 6 hours to more than 6 hours. Six hours was selected because this is what is expected to be the typical time period.

it is unlikely that the Eastern Shell Fuel Terminal has had any material impact on the Site.

4.8 Community Air Monitoring Program Results

FE obtained Site background air quality data for VOCs and total particulates by measuring these parameters over a 24-hour period on January 9 and January 10, 2020. for each parameter.

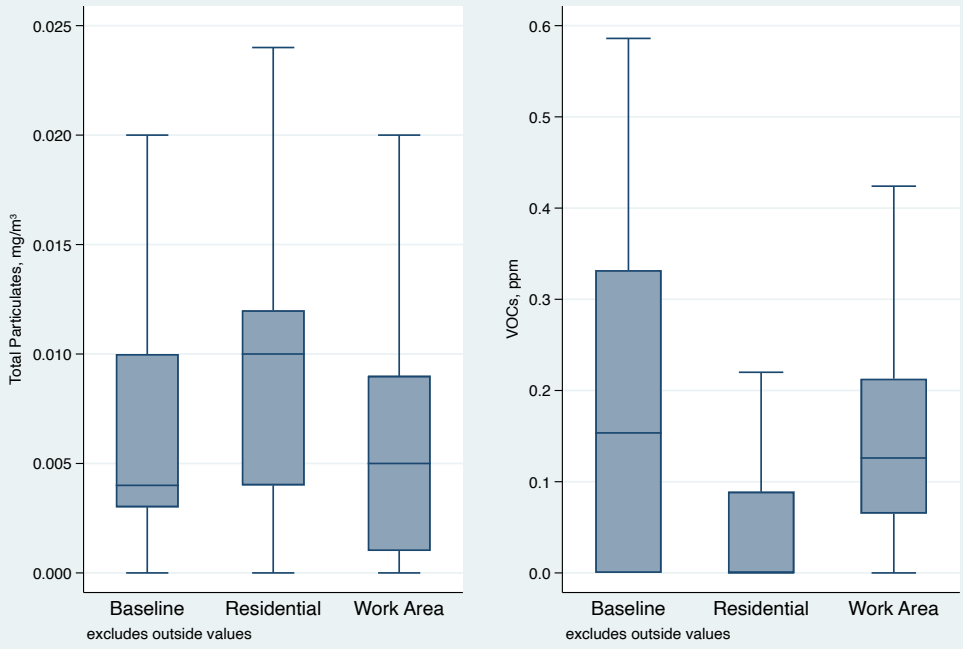
FE measured Total Particulates and VOCs during Phase II ground intrusive work from May 20 through May 29, 2020 during working hours. FE placed one air Community Air Monitoring Program (CAMP) station downwind of the work area (Work Area) and placed the second CAMP unit downwind of the work area near the perimeter fence to by the nearest residence (Residential). Table 24 summarizes the VOC and Total Particulate air monitoring results and compares them the baseline values.

Table 24 – CAMP Monitoring, Comparison of Particulates (mg/m^3) and VOCs (ppm) to Baseline, 2020 (FE)

Location	No Obs.	Min	p25	p50	p75	p99	Max	Geometric Mean
Baseline								
Total Particulates	669	0	0.003	0.004	0.01	0.055	0.061	0.006
VOCs	610	0	0	0.153	0.332	0.541	0.586	0.194
Residential								
Total Particulates	2,595	0	0.004	0.01	0.012	0.027	0.221	0.008
VOCs	2,060	0	0	0	0.089	0.83	5.71	0.266
Work Area								
Total Particulates	2,209	0	0.001	0.005	0.009	0.052	0.117	0.006
VOCs	2,334	0	0.065	0.126	0.213	0.953	0.976	0.115

Figure 10 shows the results graphically. Transient spikes during CAMP setup are excluded.

Fig. 10 - CAMP Monitoring, Particulates and VOCs Compared to Baseline



As shown, there is no material difference between baseline and active drilling conditions. There is very little difference in the median concentrations (bar in the middle of the box) or in the range of concentrations themselves. VOC concentrations remained approximately an order of magnitude lower than the CAMP 5 ppm above background action level, and particulate levels remained well below the 100 µg/m^3 above background level action limit for this parameter. In all, drilling does not appear to have had any material effect of air quality.

4.9 Data Validation

As approved by NYSDEC, all data validation and generation of the Data Usability Summary Reports (DUSRs) was completed by the FE in-house data validator. Project DUSRs concluded that with the exception of select rejected data (as summarized below), all data are considered usable for project decisions with the understanding of potential biases in some estimated results, as highlighted in the DUSR text and validation action summary tables. All Data Usability Reports (DUSRs) are included in Appendix E. As mentioned, some SVOC results in select samples were rejected due to severe QC exceedance. Reject results are summarized below.

Sample ID	Analyte	Qualifier	Notes
SSB-4 (0-1) SSB-4 (4-5) SSB-3 (0-1) SSB-1 (0-1) SSB-2 (0-1) SSB-2 (4-5) SSB-5 (0-1)	2,4-Dinitrophenol Pentachlorophenol	R	Matrix Spike & Matrix Spike Duplicate percent recovery below 10%. Matrix interference (suppression) evident and samples biased low. All associated batch samples were non-detect and are therefore considered unusable.

5.0 DISCUSSION

This section discusses the salient factors affecting soil and groundwater identified during the SRI. Section 5 focuses on PCE, xylenes, and metals, namely arsenic, as these are the constituents driving the investigation and most relevant to cleanup.

5.1 Soils

Soil boring observations during the SRI found considerable variation in soil type with depth, with some coarser soils at depth and finer soils at shallower depth intervals. Nonetheless, the overall trend is finer soils become more prevalent with increasing depth. The lower soil depths had a high proportion of silt and clay variants, but a distinct, continuous clay layer at 35 feet was not evident in the stratigraphy (Figure 3).

Stratigraphy plays an important role in soil metals concentrations. Excluding the drywells, where sludge, not soil, contains elevated metals, all metals except for arsenic in three samples are below the RRSCOS. Their concentrations seem to stem from lithology, not contamination.

Iron and aluminum are two of the fundamental components of soil minerals. In Site soils, they are highly correlated with each other (0.99). Arsenic, the one metal above the CUSCO at two locations 16 feet and deeper, is also highly correlated with iron (0.83) and with aluminum (0.77). Therefore, it seems arsenic is moderately to strongly associated with the native alumino-silicate minerals comprising the sands, silts, and clays forming the Site stratigraphy.

The relationship between arsenic and iron can be measured in the ratios of the two metals. The arsenic-to-iron ratio *decreases* by approximately 80 percent from the surface to approximately 20 feet below grade, meaning the proportion of arsenic to iron is greater in shallower soils than deeper soils. In contrast, arsenic soil concentrations *increase* approximately six-fold with depth to approximately 22 feet below grade when levels remain relatively steady, meaning the arsenic concentration increases, but proportionally there is less arsenic to iron with depth. The soils with a higher clay/silt percentage (generally the deeper soils) also have higher median arsenic concentrations, linking arsenic to lithology. The data show that the odds of arsenic in clay/silt soils are four to more than 20 times greater than in sandy soils.[5] Zinc and nickel, and chromium for the most part, also have median soil concentrations that are higher in soils with a higher clay/silt percentage, further linking metals to lithology. Iron and aluminum have higher concentrations in soils with higher clay/silt content as well.

[5] Statistically significant odds ratios calculated by means or ordered logistic regression. In contrast, for PCE, the odds are roughly equal for PCE in fine sand, silty sand, and clayey silt.

Since the lithology generally becomes finer with depth, and arsenic concentrations increase modestly with depth, and there is proportionally less arsenic in the soil, and the arsenic at depth is much further from a source, the arsenic concentrations at depth appear to related to native conditions as opposed to a contaminant.

It is the drywells beneath the parking lot on the western part of the Site that contain elevated metals concentrations. The metals occur in sludge, not soil. It is probable that the drywells acted as sinks—their intended use—where runoff from vehicles and materials storage allowed sludge with metals to accumulate over time.

5.2 Groundwater

The major compound affecting groundwater is PCE where its impacts depend on depth. Xylenes affect groundwater to a much more limited extent. PCE in groundwater appears throughout the UST and Former Plant Areas at levels above TOGS. PCE concentrations in the UST Area to 30 feet (n=15) are relatively low and range from non-detect to 109 ug/L with a median concentration of 11.3 ug/L. PCE concentrations in the UST Area increase at the bottom 30 – 35-foot interval of the UST Area where they are the highest on Site and range (n=5) from 297 ug/L to 7,610 ug/L, with a median concentration of 2,020 ug/L.

Three locations within the UST Area had PCE groundwater concentrations suggesting possible DNAPL. These were all in the 30- to 35-foot interval and are scattered (TMP-1, TMP-2, and TMP-13) indicating that there is no discrete continuous body of DNAPL, only isolated locations where PCE levels appear to be decreasing.

PCE appears to be degrading via natural biodegradation as TCE, cis-1,2-DCE, and vinyl chloride, all degradation daughter compounds of PCE, appear coincident with PCE concentrations (Figure 7, cis not shown). The ratio of TCE to PCE increases with depth, meaning there is more TCE to PCE as depth increases, while PCE concentrations for the most part are greater than TCE. The three highest concentrations of carbon dioxide and methane in groundwater in the UST Area (MW-2, MW-3, and MW-6) are approximately two or more orders-of-magnitude greater than outside the UST Area, another line of evidence that natural degradation is occurring. PCE concentrations in the UST Area have decreased significantly since the previous ATC investigation and are approximately three-times lower compared to those in 2008.

PCE concentrations in groundwater decrease dramatically outside the UST Area on the remainder of the property at the 30 – 35-foot interval and ranged (n=8) from 0.93 ug/L to 376 ug/L and had a median concentration of 120.5 ug/L. Above 30 feet PCE concentrations are even lower, ranging (n=24) from non-detect to 353 ug/L, with a median concentration of 9.2 ug/L. On a Site-wide basis, PCE groundwater concentrations are approximately 10 percent lower compared to 2008 in concentrations above 300 ug/L.

Xylene groundwater concentrations occur exclusively in the UST Area, where they range from non-detect to 48,700 ug/L, with a median concentration of 977 ug/L. Xylene concentrations are highest from grade to 20 feet below grade and drop off significantly below 20 feet. All xylene concentrations below 20 feet are at concentrations below the threshold for potential NAPL. Elevated xylene concentrations above 20 feet are limited to a small area encompassed by borings SB-5, SB-13, and SB-14, close to the USTs. Comparing filtered and unfiltered groundwater metals samples collected from 14 Site monitoring wells (incl. dup) during Phase I of the SRI to a nearby USGS monitoring well (approximately 1,600 feet south of the Site across Motts Basin) screened in the Magothy Aquifer found Site groundwater concentrations for chromium, copper, iron, lead, manganese, mercury, selenium, silver, zinc, and cadmium less than their concentrations in the Magothy Aquifer drinking water source (USGS monitoring well number Q1930 sampled on 3/17/1981 and 6/23/1983 (Table 10, p. 99. USGS Water Supply Paper 2498). Arsenic in Site groundwater was below the Magothy Aquifer arsenic concentration of <5 mg/L in 20 out of 28 monitoring well samples (71 percent).

Filtered arsenic groundwater concentrations from the temporary groundwater sampling points (n=53) were below the TOGS GA AWQS of 25 ug/L. Likewise, all other heavy metals from filtered temporary groundwater samples were below their respective TOGS GA AWQS. The Site is in Inwood, NY and receives it water from a municipal water supply. The municipal water supply obtains water from a number of local aquifers. "New York American Water – Lynbrook Operations has wells in the Upper Glacial, Magothy, Jameco and Lloyd aquifers," retrieved 3/16/2020 from http://www.amwater.com/ccr/lynbrook.pdf. Article IV, Section 2 of the Nassau Co. Public Health Ordinance, 2014, prohibits the use of private wells where there is a public water supply. Consequently, regardless of the Site water quality, law prohibits the use of private wells on the property.

6.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

This Qualitative Exposure Assessment was performed in accordance with Appendix 3B of DER-10. The following details the analysis of the parameters assessed and a summary of the recommendations. Table 25 summarizes the environmental media, exposure routes and human exposure assessment.

Table 25 – Exposure Assessment Summary

Environmental Media & Exposure Route	Human Exposure Assessment
Direct contact with surface soils (and incidental ingestion)	▪ The entire site is covered by asphalt or the concrete slab of the former on-site building. A small portion of the Site is covered with broken asphalt and exposed soil, but there are no appreciable areas of exposed soil and the exposed soil is largely vegetated. Consequently, there is no material route of exposure.
Direct contact with subsurface soils (and incidental ingestion)	▪ Exposure to subsurface soils can occur during ground intrusive work.
Ingestion of groundwater	▪ Contaminated groundwater is not being used for drinking water as the area is served by the public drinking water supply (New York American Water Co.). Nassau County prohibits the use of private wells where there is a public water supply (Article IV, Section 2, Nassau Co. Public Health Ordinance, 2014.
Direct contact with groundwater	▪ Contact with groundwater is possible if doing ground intrusive work
Inhalation of air (exposures related to soil vapor intrusion)	▪ The Site will have a waterproofing/vapor barrier around the foundation. Exposure to soil vapor is possible if doing intrusive work. It is recommended that a Soil Vapor Intrusion (SVI) evaluation be completed to evaluate the potential for exposure concerns.

The objective of the qualitative exposure assessment is to describe how human and environmental receptors may be exposed to site contaminants based upon the site-specific conditions and to assess whether there are any complete or potentially complete exposure pathways.

As discussed above, the contaminants of concern (COCs) at the Site include chlorinated and localized non-chlorinated VOCs and localized metals. These COCs were detected in soil and groundwater at concentrations exceeding their respective NYSDEC standards. The NYSDEC TOGS Class GA Groundwater Quality Standards were developed to be protective of public health based upon consideration of groundwater as a potential source of drinking water.

As specified in ECL 27-1415(2) and DER-10, the exposure assessment should consider the current conditions, as well as the reasonably anticipated future land use of the Site and the affected offsite areas, and the reasonably anticipated future groundwater use.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a receptor population; (4) a point of exposure; and (5) a route of exposure. The following paragraphs provide an overview discussion of exposure pathways that may potentially exist associated with the Site.

6.1 Contaminant Source

The predominant contaminant source is chlorinated solvents and non-chlorinated solvents from past industrial use. Parent chlorinated compound concentrations are greatest in the UST Area in the northeast corner of the Site, where their concentrations are significantly more elevated below 20 feet. Elsewhere on Site, chlorinated solvent concentrations are also greater below 20 feet. Non-chlorinated compounds are greatest in the UST area at depths less than 20 feet.

Metals are a secondary localized source of contamination. Metal concentrations are greatest as sludge in drywells D-1 through DW-9.

6.2 Contaminant Release and Transport Mechanisms

There are few locations with concentrations indicative of free-phase NAPL, suggesting that most VOC groundwater impacts are in the dissolved phase. Dissolved phase concentrations move in the direction of groundwater flow direction. There is no outfall for groundwater on Site, so there is no point of contact unless invasive work occurs below the groundwater table at approximately five feet.

VOCs do not appear to release into ambient air above the Site. Any VOCs in soil vapor appear at relatively low concentrations that are covered by pavement.

Metals occur primarily in soils and in particular in the sludge found in the drywells. Metals are below grade and appear essentially immobile. There is no discernable release mechanism or exposure unless invasive work is being done.

6.3 Points and Routes of Exposure

There are no apparent material points of exposure on Site in its current state. There are areas of broken asphalt and exposed soil in two small Site areas, but these are small and are largely vegetated. Exposure can occur during construction when invasive work is underway and there is a potential for direct contact with contaminated media, although the overall level of contamination throughout most of the Site is comparatively low.

Soil vapor concentrations across the Site increase from west to east but are primarily non-detect or at comparatively low concentrations except for elevated PCE and TCE soil vapor levels in two locations (SSV-10 and SSV-13) on the extreme eastern side. There are no buildings on Site. Consequently, there is no potential for vapor intrusion at this time. A waterproofing/vapor barrier installed as part of construction will further mitigate the potential for vapor intrusion after construction.

Source removal as part of a remediation plan and installation of engineering controls during construction will ensure there will be neither a source or pathways for migration. Invasive work at depth where chlorinated solvent concentrations are highest is not contemplated at any time. During construction, site workers could be exposed to contaminants via the air inhalation route of exposure, which will be addressed in a Site Health & Safety Plan. Table 26 summarizes the media, human health exposure pathways, controls, and status of exposure pathways during the current, pre- and post-development phases.

Table 26 - Summary of Human Health Exposure Pathways by Media and Site Operation

Medium	Exposure Pathway	Current	Construction	Post Development
Surface Soil	Dermal Contact	Pathway incomplete: Site covered with asphalt and concrete slab. *de minimus* cracks and exposed soil areas in asphalt. Access restricted by fence.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by concrete slab or two feet of clean material.
	Inhalation	Pathway incomplete: No material source. Ambient SUMMA air measurements of VOCs all below 1 $\mu g/m^3$.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by concrete slab or two feet of clean material.
	Ingestion	Pathway incomplete: Site covered with asphalt and concrete slab. *de minimus* cracks and exposed soil areas in asphalt. Access restricted by fence.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: All soils covered by concrete slab/pavement or clean material.
Subsurface Soil	Dermal Contact	Pathway incomplete: Site covered with concrete slab and *de minimus* cracks and	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by

Table 26 - Summary of Human Health Exposure Pathways by Media and Site Operation

Medium	Exposure Pathway	Current	Construction	Post Development
		exposed soil areas in asphalt. Access restricted by fence.		concrete slab/pavement or two feet of clean material.
	Inhalation	Pathway incomplete: No material source. Site covered by pavement. Access restricted by fence.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Contaminated soil removed and residual soils covered by concrete slab/pavement or two feet of clean material.
	Ingestion	Pathway incomplete: Site covered with concrete slab and *de minimus* cracks and exposed soil areas in asphalt. Access restricted by fence.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: All soils covered by concrete slab/pavement or clean material.
Soil Vapor	Dermal Contact	Not Applicable	Not Applicable	Not Applicable
	Inhalation	Pathway incomplete: No material source. Site covered with concrete slab and *de minimus* cracks and exposed soil areas in asphalt Ambient SUMMA air measurements of VOCs all below 1 $\mu g/m^3$.	Pathway complete but controlled by air monitoring.	Pathway incomplete: Contaminated soil removed and vapor barrier /waterproofing in place around and under foundation. Recommend that a SVI evaluation be completed to evaluate the potential for exposure concerns and assess the efficacy of the waterproofing/vapor barrier.
	Ingestion	Not Applicable	Not Applicable	Not Applicable
Groundwater	Dermal Contact	Pathway incomplete: Site covered by pavement. Groundwater approximately five (5) feet below grade.	Pathway complete but controlled by Health & Safety Plan procedures.	Pathway incomplete: Groundwater contact prevented by concrete slab and vapor barrier/waterproofing around and under foundation and prohibition on use of groundwater as an institutional control.
	Inhalation	Pathway incomplete: Site covered by pavement and contaminant at depth. Groundwater approximately five (5) feet below grade.	Pathway complete but controlled by air monitoring.	Site covered with concrete slab and *de minimus* cracks and exposed soil areas in asphalt Pathway incomplete: Vapor barrier/waterproofing in place around foundation. Recommend that a SVI evaluation be completed to evaluate the potential for exposure concerns and assess the efficacy of the waterproofing/vapor barrier.
	Ingestion	Pathway incomplete. Site	Pathway complete but	Pathway incomplete: Public

Table 26 - Summary of Human Health Exposure Pathways by Media and Site Operation

Medium	Exposure Pathway	Current	Construction	Post Development
		covered by pavement. Municipal water serves community.	controlled by Health & Safety Plan procedures.	water supply serves community.

6.4 Receptor Population

The receptor population includes occupants of the residences adjoining the property on the south, occupants of the adjacent commercial operations, and passersby. The Site is in an undisturbed condition appears to pose little risk to any of these populations as there have been no elevated vapor, particulate, or soil vapor measurements of any significance observed during sampling and drilling operations. The area is commercial/residential and few passersby were observed during any of the field work.

The principal receptor population is construction workers during remediation and building of the new facility. These will be protected by a Health & Safety Plan, construction control measures, and engineering and institutional controls.

After construction, potential receptors include future Site occupants. Future Site occupants could potentially be exposed to soil vapors, although these will be mitigated by means of a concrete slab and waterproofing/vapor barrier that will be evaluated by a SVI. The overall low level of soil vapors across the Site, soil removal and/or covering with approved fill as a cap, and new concrete slab make the potential for soil vapor intrusion extremely low even before mitigation measures are adopted.

There is a low potential for off-site soil vapor concerns. Soil vapor concentrations at the Site boundary are very low except for those on the extreme eastern side of the Site adjacent to Gates Avenue.

6.5 Conclusions

In conclusion, complete exposure pathways will exist during the remediation and construction phases. These pathways will be controlled by air monitoring and implementing the procedures in a Health & Safety Plan and Community Air Monitoring Plan. Following construction and development, all exposure pathways will be incomplete or eliminated. Source removal will remove the majority of the most severely impacted soil. Engineering controls in the form of the concrete slab, clean material cap, and vapor barrier will add an additional level of protection in that they ensure there are no complete human health exposure pathways. A SVI will be conducted after the building is complete to evaluate vapor intrusion. A Site-specific prohibition

on groundwater use will eliminate this potential exposure pathway. Following remediation and development, there will be no complete human health exposure pathways.

7.0 SUMMARY and CONCLUSIONS

Section 7 focuses on the salient features affecting the Site and those that drive remediation and future use.

7.1 Soil

The only significant soil impacts are those associated with the sludge in the drywells. One area of shallow soils is modestly impacted by SVOCs marginally above the URSCOs and RRSCOs, but below the CUSCOs. Metals and VOCs exceed the URSCOs in a limited number of instances and these are almost exclusively within the UST Area. Outside the drywells, only arsenic exceeded the RRSCO and CUSCO in three instances. The arsenic concentrations are only modestly above the SCOs, are at depth, and appear due to native soil conditions, not contamination. Table 27 lists the compounds and metals above the URSCOs, RRSCOs, and CUSCOs

Table 27 – Soils Exceeding SCOS

Area	Boring	Depth	URSCO	RRSCO	CUSCO
Exposed Soil Area	HA-9	2	Benzo(a)anthracene; benzo(b)fluoranthene; Indeno, cd,123,pyrene	Benzo(a)anthracene; benzo(b)fluoranthene; Indeno, cd,123,pyrene	--
	HA-9	2	Pb, Zn	--	--
UST Area	B-14	5	Pb, Zn	--	--
	B-7	5	Pb, Zn	--	--
	SB-13	6	Xylenes	--	--
	SB-5	7	Ethylbenzene; n-propylbenzene; toluene; xylenes; 1,3,5-TMB	Xylenes, ethylbenzene	--
	SB-13	11	Xylenes	--	--
	SB-5	11	Xylenes, As	As	As
	SB-14	12	Ethylbenzene, xylenes	--	--
	SB-13	14	cis,1,2-DCE; ethylbenzene, xylenes	--	--
	SB-1	26	Acetone, PCE, TCE, Cr	--	--
	SB-10	27	PCE	--	--
	SB-13	29	As, Cr	--	--
	SB-1	29.5	PCE, TCE	--	--
	SB-14	30	PCE, As, Cr, Zn	--	--
	SB-2	30	PCE	--	--
Drywell Area	DW-1	8	Cd, Pb	--	--
	DW-2	8	Hg, Pb, Cr, Cd	Hg, Cd, Pb, Cr	Cd, Pb
	DW-3	8	As, Hg, Cd, Pb, Cu, Cr, Ni, Ag, Zn	As, Hg, Cd, Pb, Cu	As, Hg, Cd, Pb, Cu
	DW-4	8	Cd, Pb, Cr	--	--
	DW-5	8	Hg	--	--

Table 27 – Soils Exceeding SCOS

Area	Boring	Depth	URSCO	RRSCO	CUSCO
	DW-6	8	Hg, Pb, Cr	Cd, Pb	--
	DW-7	8	Hg, Pb, Cr	Pb	--
	DW-8	8	Hg, Pb, Cr	Pb	Pb
	DW-9	8	As, Pb, Cr, Se	As, Pb	As
Former Plant Area	SB-3	16	As	As	As
	SB-10	27	PCE	--	--
	SB-4	35	As	As	As
	SB-7	35	Cr		

7.2 Groundwater

PCE impacts to groundwater occur throughout the Site. These are most prevalent in the UST Area at the 30 to 35-foot depth. Elsewhere within the Site, PCE groundwater concentrations are also highest at the 30- to 35-foot depth. Daughter compounds from natural degradation of PCE (TCE, cis-1,2-DCE, and VC) also occur coincident with PCE. PCE groundwater concentrations within the UST Area exhibit a three-times decrease compared to 2008 concentrations. Across the Site as a whole, PCE levels have decreased approximately 10 percent for concentrations above 300 µg/L since 2008. Xylenes impact groundwater almost exclusively in a small area within the UST Area at depth above 20 feet below grade.

7.3 Soil Vapor

Almost one-half of all VOC compounds in the soil vapor samples were below detection limits. Detected concentrations of VOCs are mostly very low. There are no NYSDOH soil vapor guidelines, but all but a few soil vapor results are below NYSDOH ambient air action guidance values. For PCE, all but three sample locations had results below the NYSDOH ambient air guidance value of 30 µg/m^3. The samples above this guideline were SSV-9 (43 µg/m^3), SSV-13 (111 µg/m^3), and SSV-10 (548 µg/m^3). These are on the eastern side of the Site and the two highest values are near the Site's eastern boundary.

For TCE, five soil vapor sample results were above the NYSDOH ambient air action guidance value of 2 µg/m^3. The samples were SSV-8 (6.4 µg/m^3), SSV-12 (3.4 µg/m^3), SSV-9 (12 µg/m^3), SSV-13 (53.7 µg/m^3), and SSV-10 (55.4 µg/m^3). These are on the eastern side of the Site and the two highest values are near the eastern Site border and coincide with the highest PCE soil vapor concentrations. Other than these locations, the balance of the Site had PCE and TCE soil vapor concentrations below the NYSDOH soil vapor action threshold values.

8.0 REFERENCES

Gibbs & Hill, Inc. November 1984. *Hydrogeological Study, Fountain Avenue, Pennsylvania Avenue, and Edgemere Landfills.* Part 2 – Site Report, New York City Department of Sanitation.

C.W. Fetter. 2001. *Applied Hydrogeology,* Fourth Edition. Prentice-Hall, Inc. Upper Saddle River, New Jersey.

ATC Associates, Inc. June 8, 2009. *NYSDEC Brownfield Cleanup Program, Remedial Investigation Report, 175 Roger Avenue, Inwood, New York 11096, Index # A1-0543-0406, Site # C130164, Volume I.*

Todd, D. K. 1980. *Groundwater Hydrology.* Second Edition. John Wiley & Sons, Inc. Hoboken, New Jersey.

Kruseman, G. P. and deRitter, N. A. 2000. Second Edition. *Analysis and Evaluation of Pumping Test Data.* International Institute for Land Reclamation and Improvement. Wageningen, The Netherlands, 1994.

ATC Associates, Inc. *NYSDEC Brownfield Cleanup Program, Remedial Investigation Work Plan, 175 Roger Avenue, Inwood, New York 11096.* Index # A1-0543-0406, Site No. C130164. April 20, 2007.

ATC Associates, Inc. *NYSDEC Brownfield Cleanup Program, Remedial Investigation Work Plan, 175 Roger Avenue, Inwood, New York 11096.* Index # A1-0543-0406, Site No. C130164. June 8, 2009.

ATC Associates Inc., *Phase I Environmental Site Assessment of Long Island Party Rentals,* 175 Roger Avenue, Inwood, New York 11096. June 19, 2005.

ATC Associates Inc., *Site Investigation Report Long Island Party Rentals,* 175 Roger Avenue, Inwood, New York 11096. June 27, 2005.

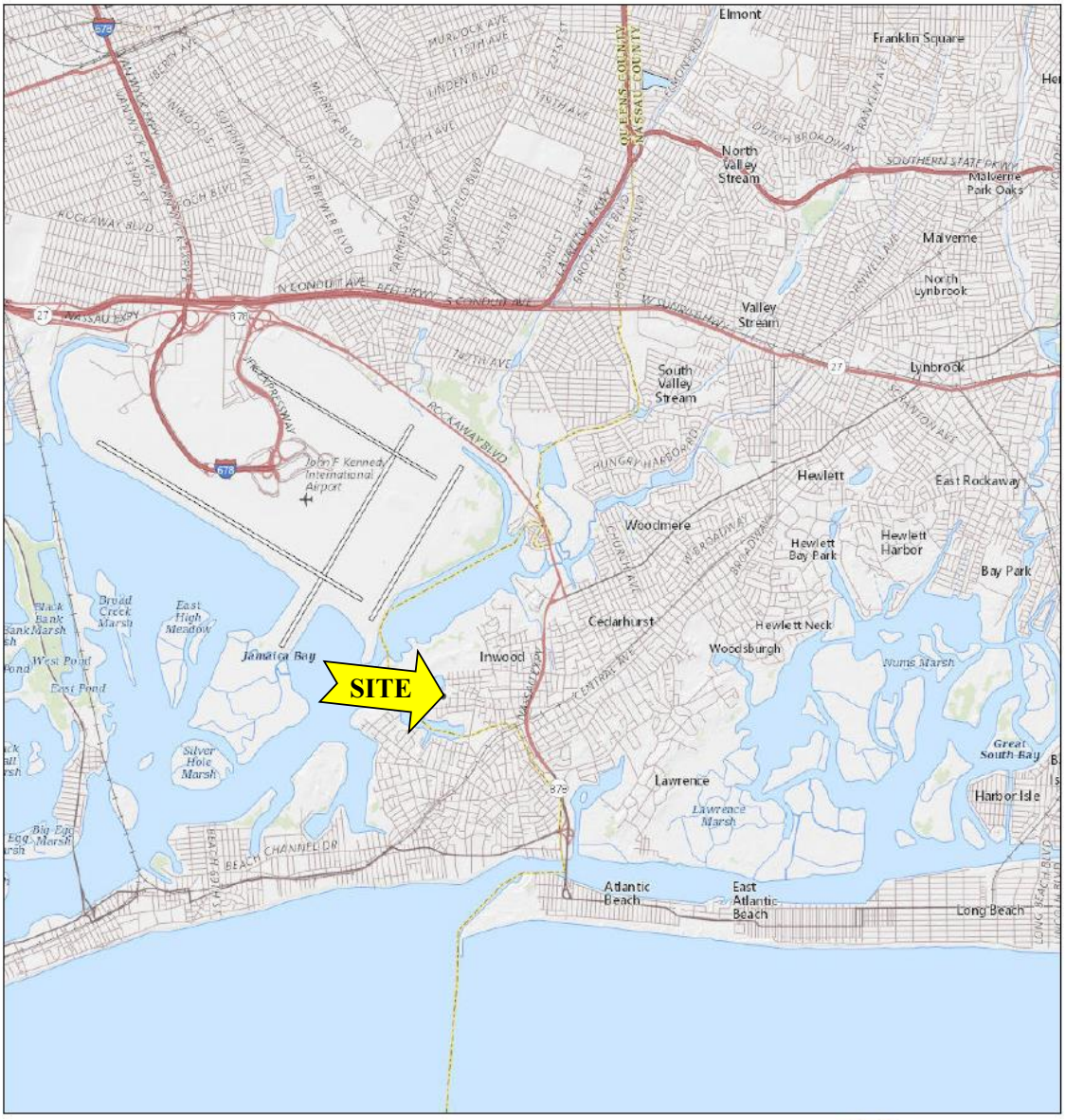
ATC Associates Inc., *NYSDEC Brownfield Cleanup Program Alternative Analysis Report Remedial Work Plan,* 175 Roger Avenue, Inwood, New York 11096. April 20, 2010.
Fleming-Lee Shue, Inc., *Draft Phase I Environmental Site Assessment,* 175 Roger Avenue, Inwood, New York 11096. November 2018.

Brock, P.C and Brock, P. W.G. School of Earth and Environmental Sciences. Queens College. *Bedrock Geology of New York City: More than 600 m.y. of geologic history,* Field Guide for Long Island Geologists Field Trip, October 27, 2001.

Fowler, T., Thompson, B., and Mueller, J. *Acetone and 2-Butanone Creation Associated with Biological and Chemical Remediation of Environmental Contamination,* Remediation, Winter 2011.

Ground-Water Resources of Kings and Queens Counties, Long Island, New York. Water Supply Paper 2498. United State Geological Survey, 1999. H.T. Buxton and P. K. Shernoff.

FIGURES



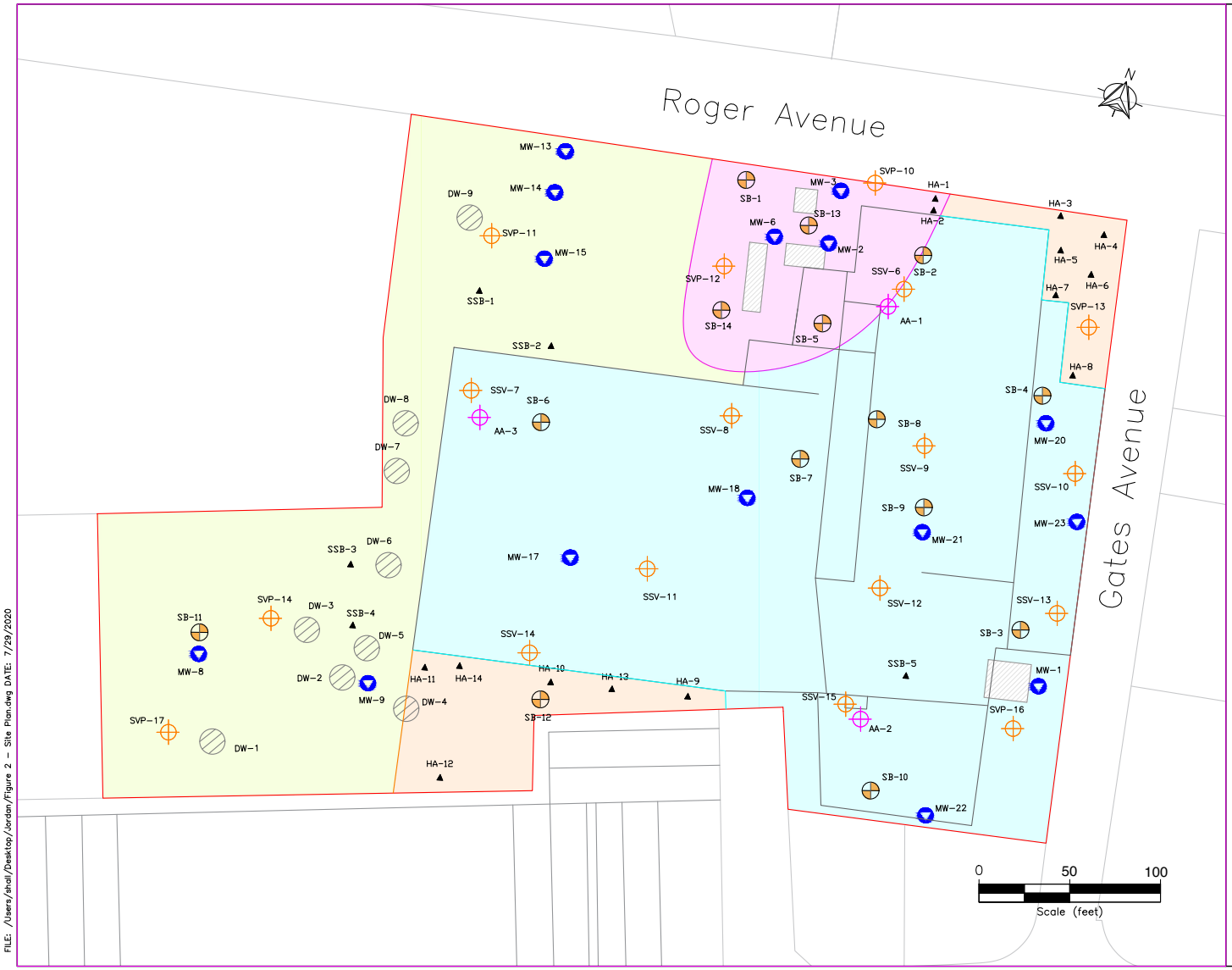
Quadrant 7.5 Minute Topographic Map, published by the USGS, and obtained from National Map Viewer ©2018

Fleming Lee Shue

FIGURE 1: SITE LOCATION MAP

SITE: 175 Rogers Ave
Inwood, NY, 11096

CLIENT: AJM Capital



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Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY 11096
BCP No. 130164

Figure 2

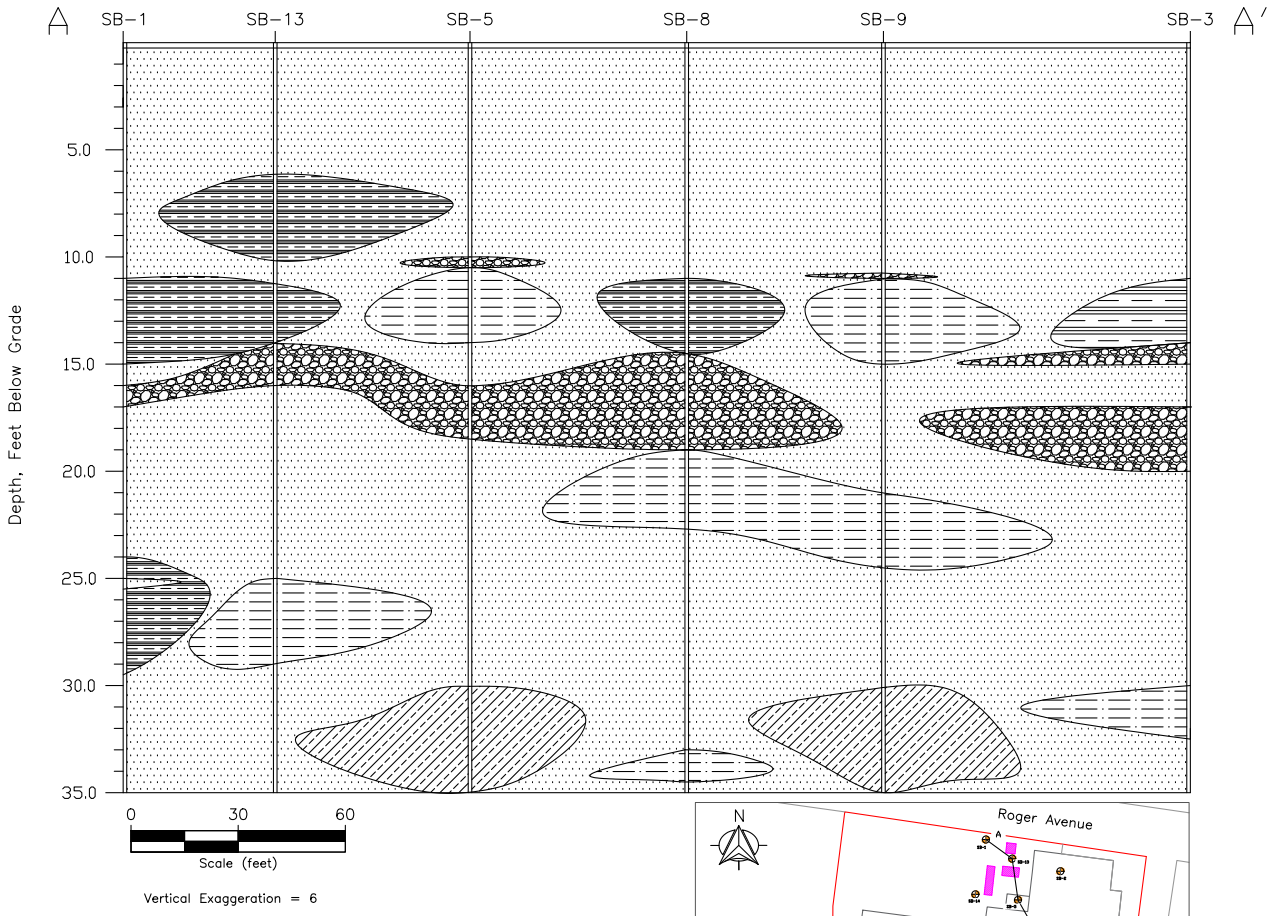
Site Plan and Sampling Locations

July 2020

Project Number
10188-017

LEGEND

- Tax Lot Boundaries
- Former Warehouse Building and Room Outlines
- BCP Boundary
- Geophysical Anomalies
- Dry Well
- Existing Monitoring Well
- Soil Vapor Sample Location
- Ambient Air Sample Location
- Soil Boring Sample Location
- Shallow Soil Sample Location
- UST Area
- Former Plant Area
- Exposed Soil Area
- Drywell Area



Notes:
Data collected from 5/20/2020 – 5/29/2020.
Where data and soil descriptions are missing, geology is inferred.

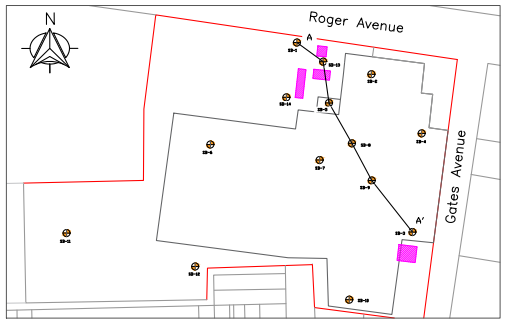


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Figure 3A

Remedial Investigation Soil Cross-section A-A'

June 2020

Project Number
10188-017

LEGEND

- Concrete
- Gravels
- Sand
- Silt
- Clay
- Clayey/Silty Sand

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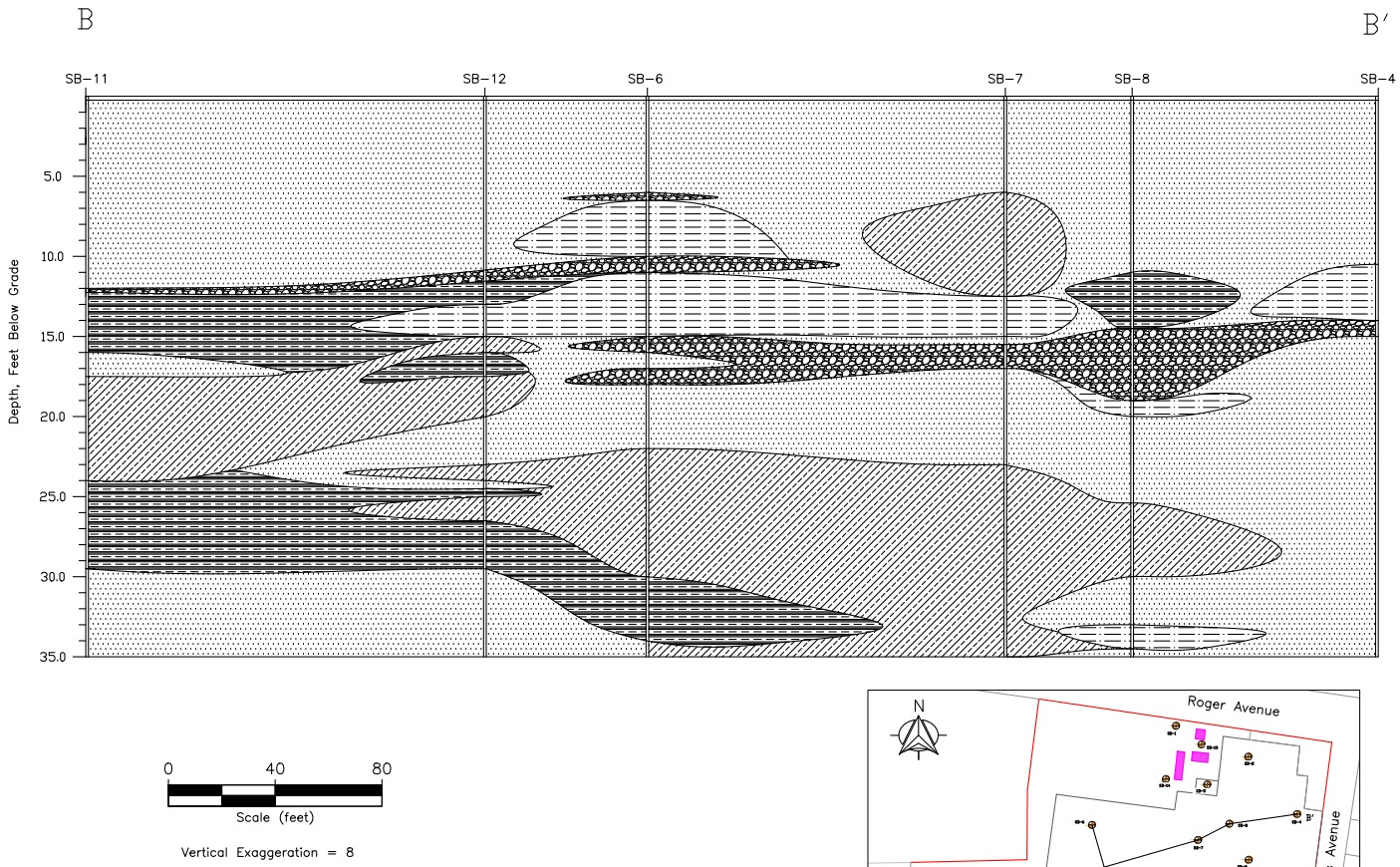
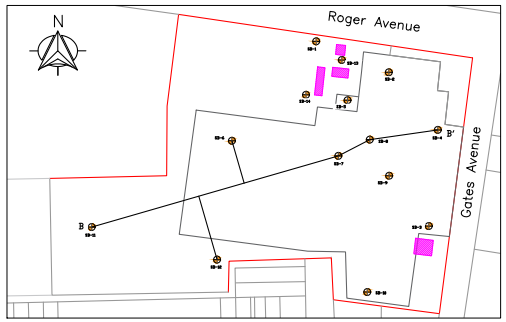


0 40 80

Scale (feet)

Vertical Exaggeration = 8



Notes:
Data collected from 5/20/2020 – 5/29/2020.
Where data and soil descriptions are missing, geology is inferred.

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Figure 3B

Remedial Investigation Soil Cross-section B-B'

June 2020

Project Number
10188-017

LEGEND

- Concrete
- Gravels
- Sand
- Silt
- Clay
- Clayey/Silty Sand

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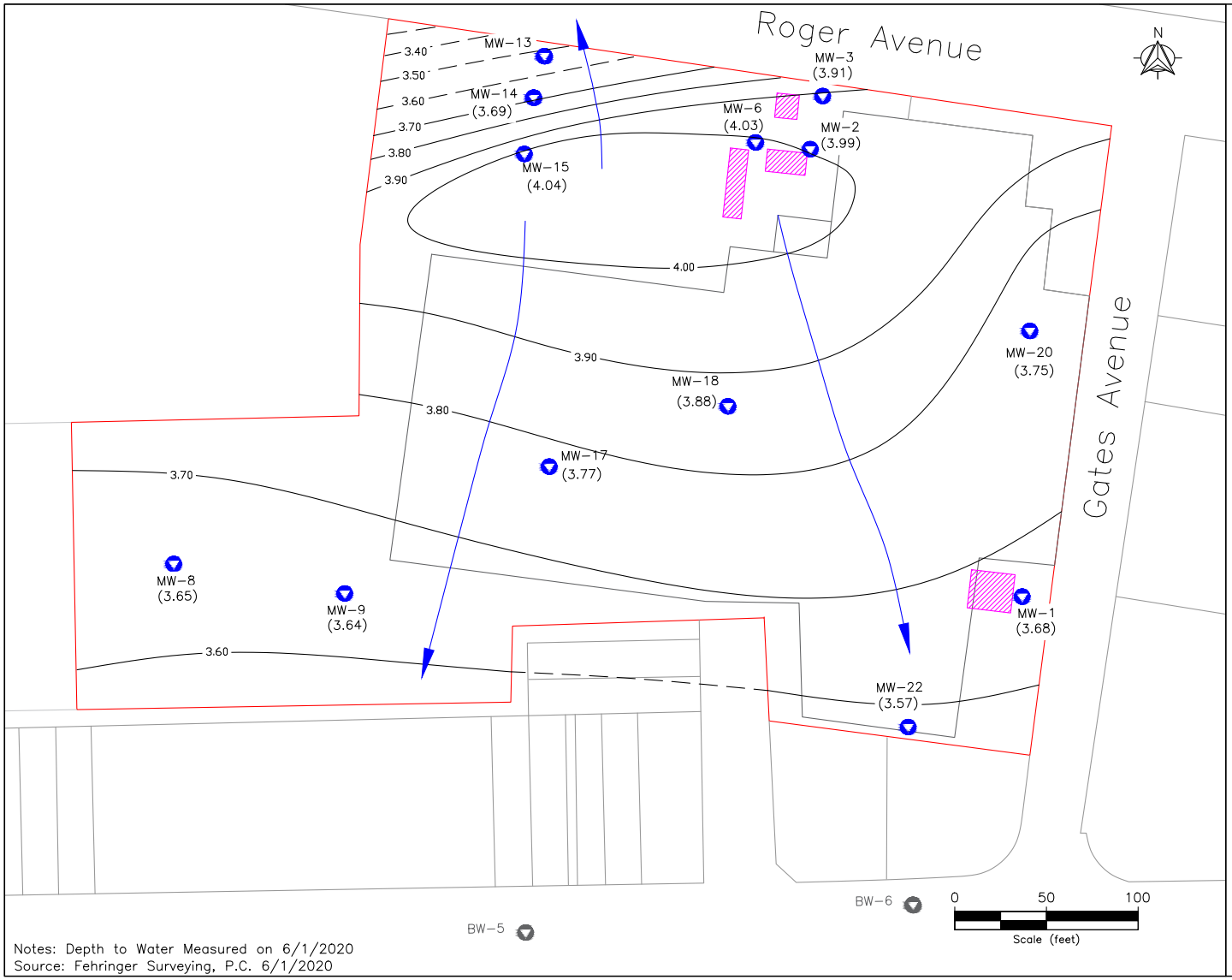

Notes: Depth to Water Measured on 6/1/2020
Source: Fehringer Surveying, P.C. 6/1/2020

FILE: /Users/shall/Desktop/Jordan/Figure X Groundwater Contour_jb.dwg DATE: 7/22/2020

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158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, N, 11096
BCP No. C130164

Figure 4

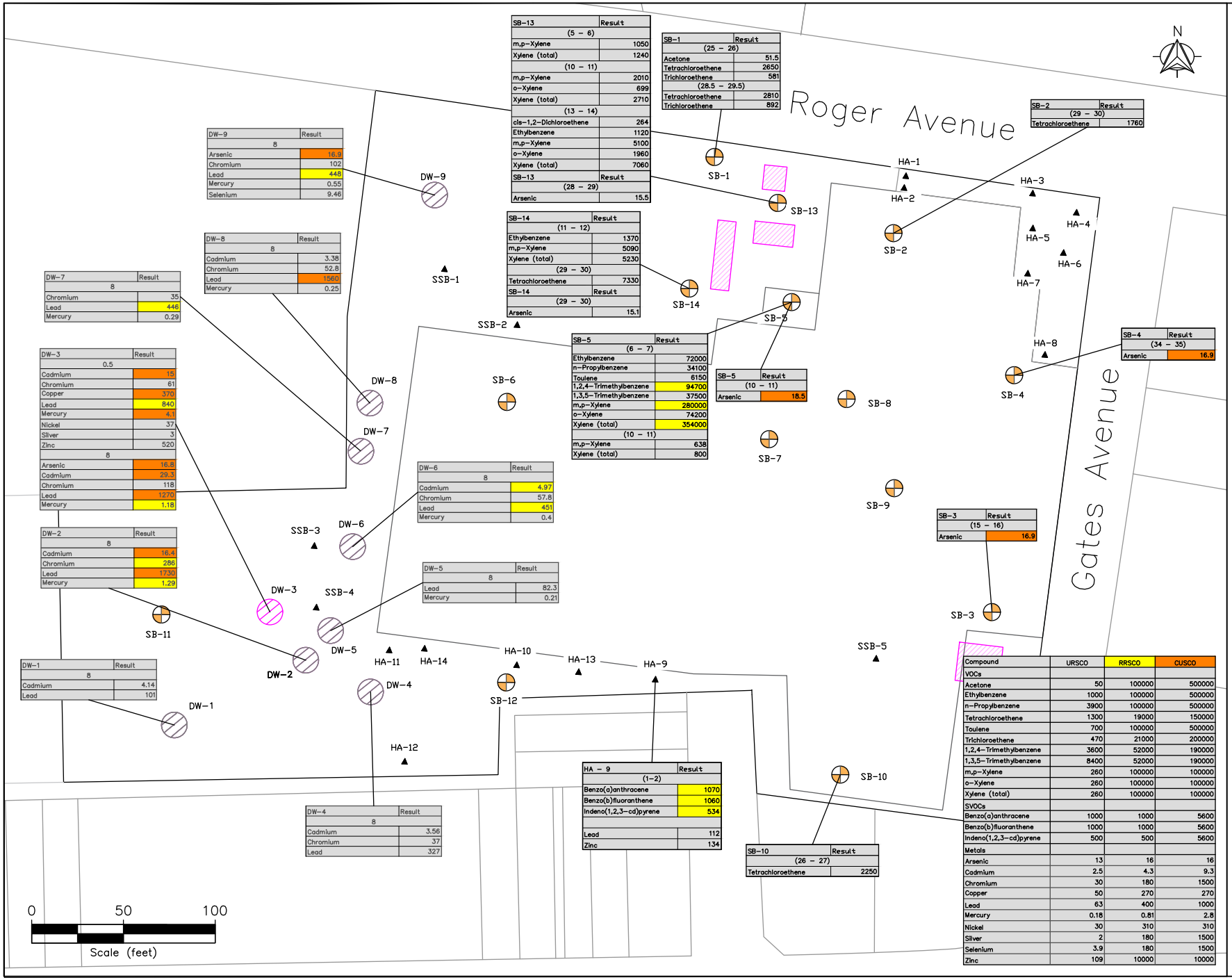
Groundwater Flow Direction

July 2020

Project Number
10188-017

LEGEND

- Former Warehouse Building Outline
- BCP Boundary
- Geophysical Anomalies
- Existing Monitoring Well and GW Elevation (18')
- Groundwater Contour (dashed where inferred)
- Groundwater Flow Direction



SB-13	Result
(5 – 6)	
m,p-Xylene	1050
Xylene (total)	1240
(10 – 11)	
m,p-Xylene	2010
o-Xylene	699
Xylene (total)	2710
(13 – 14)	
cis-1,2-Dichloroethene	264
Ethylbenzene	1120
m,p-Xylene	5100
o-Xylene	1960
Xylene (total)	7060
SB-13	Result
(28 – 29)	
Arsenic	15.5

SB-1	Result
(25 – 26)	
Acetone	51.5
Tetrachloroethene	2650
Trichloroethene	581
(28.5 – 29.5)	
Tetrachloroethene	2810
Trichloroethene	892

SB-2	Result
(29 – 30)	
Tetrachloroethene	1760

DW-9	Result
8	
Arsenic	16.9
Chromium	102
Lead	448
Mercury	0.55
Selenium	9.46

SB-14	Result
(11 – 12)	
Ethylbenzene	1370
m,p-Xylene	5090
Xylene (total)	5230
(29 – 30)	
Tetrachloroethene	7330
SB-14	Result
(29 – 30)	
Arsenic	15.1

DW-8	Result
8	
Cadmium	3.38
Chromium	52.8
Lead	1560
Mercury	0.25

DW-7	Result
8	
Chromium	35
Lead	446
Mercury	0.29

SB-5	Result
(6 – 7)	
Ethylbenzene	72000
n-Propylbenzene	34100
Toulene	6150
1,2,4-Trimethylbenzene	94700
1,3,5-Trimethylbenzene	37500
m,p-Xylene	280000
o-Xylene	74200
Xylene (total)	354000
(10 – 11)	
m,p-Xylene	638
Xylene (total)	800

SB-5	Result
(10 – 11)	
Arsenic	18.5

SB-4	Result
(34 – 35)	
Arsenic	16.9

DW-3	Result
0.5	
Cadmium	15
Chromium	61
Copper	370
Lead	840
Mercury	4.1
Nickel	37
Silver	3
Zinc	520
8	
Arsenic	16.8
Cadmium	29.3
Chromium	118
Lead	1270
Mercury	1.18

DW-6	Result
8	
Cadmium	4.97
Chromium	57.8
Lead	451
Mercury	0.4

SB-3	Result
(15 – 16)	
Arsenic	16.9

DW-2	Result
8	
Cadmium	16.4
Chromium	286
Lead	1730
Mercury	1.29

DW-5	Result
8	
Lead	82.3
Mercury	0.21

DW-1	Result
8	
Cadmium	4.14
Lead	101

HA – 9	Result
(1–2)	
Benzo(a)anthracene	1070
Benzo(b)fluoranthene	1060
Indeno(1,2,3-cd)pyrene	534
Lead	112
Zinc	134

DW-4	Result
8	
Cadmium	3.56
Chromium	37
Lead	327

SB-10	Result
(26 – 27)	
Tetrachloroethene	2250

Compound	URSCO	RRSCO	CUSCO
VOCs			
Acetone	50	100000	500000
Ethylbenzene	1000	100000	500000
n-Propylbenzene	3900	100000	500000
Tetrachloroethene	1300	19000	150000
Toulene	700	100000	500000
Trichloroethene	470	21000	200000
1,2,4-Trimethylbenzene	3600	52000	190000
1,3,5-Trimethylbenzene	8400	52000	190000
m,p-Xylene	260	100000	100000
o-Xylene	260	100000	100000
Xylene (total)	260	100000	100000
SVOCs			
Benzo(a)anthracene	1000	1000	5600
Benzo(b)fluoranthene	1000	1000	5600
Indeno(1,2,3-cd)pyrene	500	500	5600
Metals			
Arsenic	13	16	16
Cadmium	2.5	4.3	9.3
Chromium	30	180	1500
Copper	50	270	270
Lead	63	400	1000
Mercury	0.18	0.81	2.8
Nickel	30	310	310
Silver	2	180	1500
Selenium	3.9	180	1500
Zinc	109	10000	10000

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY, 11096
BCP No. 130164

Figure 5

Soil Results Above Soil Cleanup Objectives

July 2020

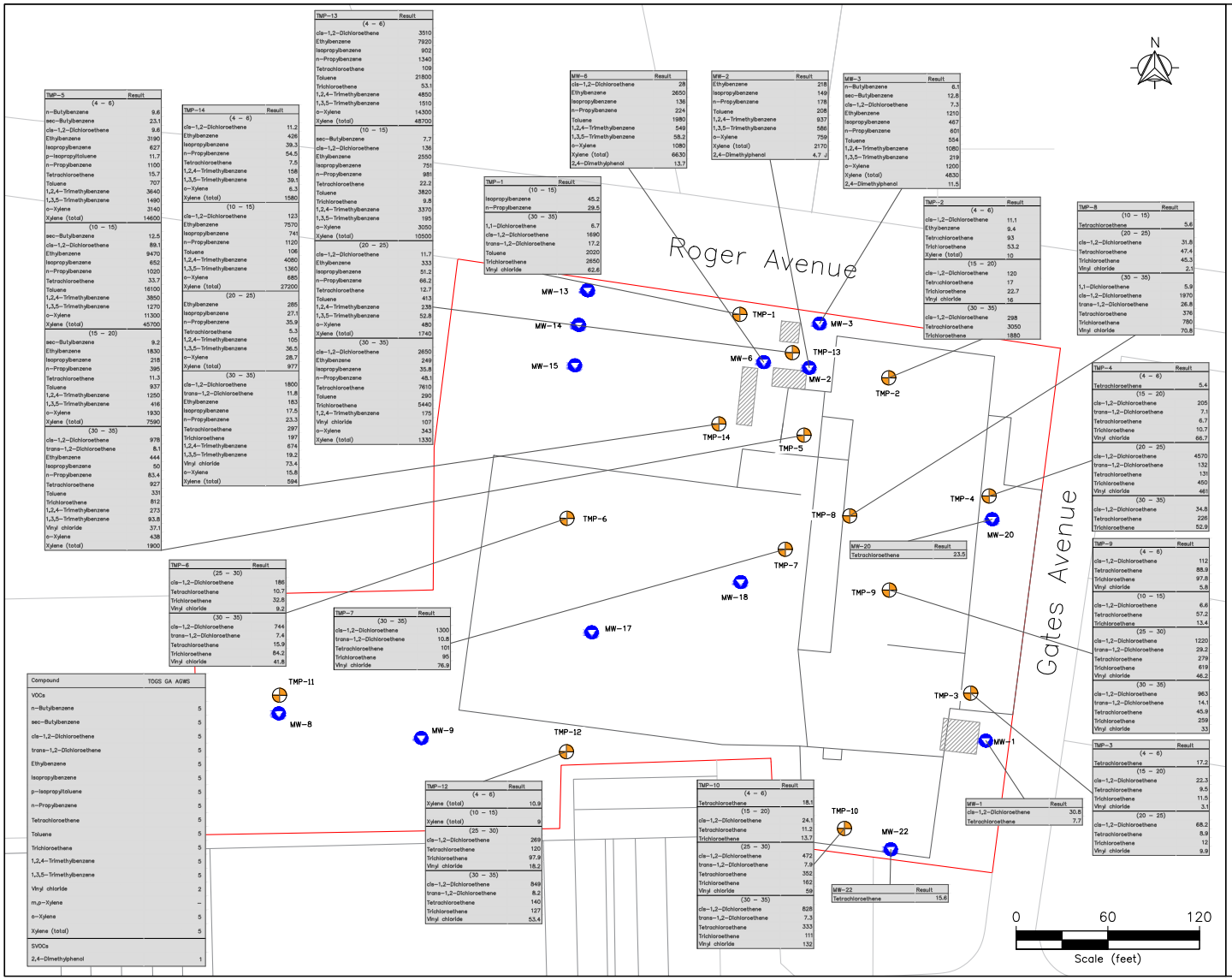
Project Number
10188-017

LEGEND

- Former Warehouse Building Outline
- BCP Boundary
- Soil Boring Location
- Shallow Soil Sample Location
- Drywell Sample Location
- Geophysical Anomalies

Notes:
Samples collected 5/21/20 – 5/29/20
VOC and SVOC data are reported in ug/kg
Metals data are reported in mg/kg
All sample depths are reported in feet below grade
URSCOs – Unrestricted Use Soil Cleanup Objectives
RRSCOs – Restricted Residential Soil Cleanup Objectives (Yellow)
CUSCOs – Commercial Use Soil Cleanup Objectives (Orange)
Drywell data taken from ATC 2009 RIR

FILE: /Users/shall/Desktop/Jordan/5 Soil Exceedance.dwg DATE: 8/24/2020



TMP-5	Result
(4 – 6)	
n-Butylbenzene	9.6
sec-Butylbenzene	23.1
cis-1,2-Dichloroethene	9.6
Ethylbenzene	3190
Isopropylbenzene	627
p-Isopropyltoluene	11.7
n-Propylbenzene	1100
Tetrachloroethene	15.7
Toluene	707
1,2,4-Trimethylbenzene	3640
1,3,5-Trimethylbenzene	1490
o-Xylene	3140
Xylene (total)	14600
(10 – 15)	
sec-Butylbenzene	12.5
cis-1,2-Dichloroethene	89.1
Ethylbenzene	9470
Isopropylbenzene	652
n-Propylbenzene	1020
Tetrachloroethene	33.7
Toluene	16100
1,2,4-Trimethylbenzene	3850
1,3,5-Trimethylbenzene	1270
o-Xylene	11300
Xylene (total)	45700
(15 – 20)	
sec-Butylbenzene	9.2
Ethylbenzene	1830
Isopropylbenzene	218
n-Propylbenzene	395
Tetrachloroethene	11.3
Toluene	937
1,2,4-Trimethylbenzene	1250
1,3,5-Trimethylbenzene	416
o-Xylene	1930
Xylene (total)	7590
(30 – 35)	
cis-1,2-Dichloroethene	978
trans-1,2-Dichloroethene	8.1
Ethylbenzene	444
Isopropylbenzene	50
n-Propylbenzene	83.4
Tetrachloroethene	927
Toluene	331
Trichloroethene	812
1,2,4-Trimethylbenzene	273
1,3,5-Trimethylbenzene	93.8
Vinyl chloride	37.1
o-Xylene	438
Xylene (total)	1900

TMP-14	Result
(4 – 6)	
cis-1,2-Dichloroethene	11.2
Ethylbenzene	426
Isopropylbenzene	39.3
n-Propylbenzene	54.5
Tetrachloroethene	7.5
1,2,4-Trimethylbenzene	158
1,3,5-Trimethylbenzene	39.1
o-Xylene	6.3
Xylene (total)	1580
(10 – 15)	
cis-1,2-Dichloroethene	123
Ethylbenzene	7570
Isopropylbenzene	741
n-Propylbenzene	1120
Toluene	106
1,2,4-Trimethylbenzene	4080
1,3,5-Trimethylbenzene	1360
o-Xylene	665
Xylene (total)	27200
(20 – 25)	
Ethylbenzene	285
Isopropylbenzene	27.1
n-Propylbenzene	35.9
Tetrachloroethene	5.3
1,2,4-Trimethylbenzene	105
1,3,5-Trimethylbenzene	36.5
o-Xylene	28.7
Xylene (total)	977
(30 – 35)	
cis-1,2-Dichloroethene	1800
trans-1,2-Dichloroethene	11.8
Ethylbenzene	183
Isopropylbenzene	17.5
n-Propylbenzene	23.3
Tetrachloroethene	297
Trichloroethene	197
1,2,4-Trimethylbenzene	674
1,3,5-Trimethylbenzene	19.2
Vinyl chloride	73.4
o-Xylene	15.8
Xylene (total)	594

TMP-13	Result
(4 – 6)	
cis-1,2-Dichloroethene	3510
Ethylbenzene	7920
Isopropylbenzene	902
n-Propylbenzene	1340
Tetrachloroethene	109
Toluene	21800
Trichloroethene	53.1
1,2,4-Trimethylbenzene	4850
1,3,5-Trimethylbenzene	1510
o-Xylene	14300
Xylene (total)	48700
(10 – 15)	
sec-Butylbenzene	7.7
cis-1,2-Dichloroethene	136
Ethylbenzene	2550
Isopropylbenzene	751
n-Propylbenzene	981
Tetrachloroethene	22.2
Toluene	3820
Trichloroethene	9.8
1,2,4-Trimethylbenzene	3370
1,3,5-Trimethylbenzene	995
o-Xylene	3050
Xylene (total)	10500
(20 – 25)	
cis-1,2-Dichloroethene	11.7
Ethylbenzene	333
Isopropylbenzene	51.2
n-Propylbenzene	66.2
Tetrachloroethene	12.7
Toluene	413
1,2,4-Trimethylbenzene	238
1,3,5-Trimethylbenzene	52.8
o-Xylene	480
Xylene (total)	1740
(30 – 35)	
cis-1,2-Dichloroethene	2650
Ethylbenzene	249
Isopropylbenzene	35.8
n-Propylbenzene	48.1
Tetrachloroethene	7610
Toluene	290
Trichloroethene	5440
1,2,4-Trimethylbenzene	175
Vinyl chloride	107
o-Xylene	343
Xylene (total)	1330

MW-6	Result
cis-1,2-Dichloroethene	28
Ethylbenzene	2650
Isopropylbenzene	136
n-Propylbenzene	224
Toluene	1980
1,2,4-Trimethylbenzene	549
1,3,5-Trimethylbenzene	58.2
o-Xylene	1080
Xylene (total)	6630
2,4-Dimethylphenol	13.7

MW-2	Result
Ethylbenzene	218
Isopropylbenzene	149
n-Propylbenzene	178
Toluene	208
1,2,4-Trimethylbenzene	937
1,3,5-Trimethylbenzene	586
o-Xylene	759
Xylene (total)	2170
2,4-Dimethylphenol	4.7 J

MW-3	Result
n-Butylbenzene	6.1
sec-Butylbenzene	12.8
cis-1,2-Dichloroethene	7.3
Ethylbenzene	1210
Isopropylbenzene	467
n-Propylbenzene	601
Toluene	554
1,2,4-Trimethylbenzene	1080
1,3,5-Trimethylbenzene	219
o-Xylene	1200
Xylene (total)	4830
2,4-Dimethylphenol	11.5

TMP-1	Result
(10 – 15)	
Isopropylbenzene	45.2
n-Propylbenzene	29.5
(30 – 35)	
1,1-Dichloroethene	6.7
cis-1,2-Dichloroethene	1690
trans-1,2-Dichloroethene	17.2
Toluene	2020
Trichloroethene	2650
Vinyl chloride	62.6

TMP-2	Result
(4 – 6)	
cis-1,2-Dichloroethene	11.1
Ethylbenzene	9.4
Tetrachloroethene	93
Trichloroethene	53.2
Xylene (total)	10
(15 – 20)	
cis-1,2-Dichloroethene	120
Tetrachloroethene	17
Trichloroethene	22.7
Vinyl chloride	16
(30 – 35)	
cis-1,2-Dichloroethene	298
Tetrachloroethene	3050
Trichloroethene	1880

TMP-8	Result
(10 – 15)	
Tetrachloroethene	5.6
(20 – 25)	
cis-1,2-Dichloroethene	31.8
Tetrachloroethene	47.4
Trichloroethene	45.3
Vinyl chloride	2.1
(30 – 35)	
1,1-Dichloroethene	5.9
cis-1,2-Dichloroethene	1970
trans-1,2-Dichloroethene	26.8
Tetrachloroethene	376
Trichloroethene	780
Vinyl chloride	70.8

TMP-4	Result
(4 – 6)	
Tetrachloroethene	5.4
(15 – 20)	
cis-1,2-Dichloroethene	205
trans-1,2-Dichloroethene	7.1
Tetrachloroethene	6.7
Trichloroethene	10.7
Vinyl chloride	66.7
(20 – 25)	
cis-1,2-Dichloroethene	4570
trans-1,2-Dichloroethene	132
Tetrachloroethene	131
Trichloroethene	450
Vinyl chloride	461
(30 – 35)	
cis-1,2-Dichloroethene	34.8
Tetrachloroethene	226
Trichloroethene	52.9

TMP-6	Result
(25 – 30)	
cis-1,2-Dichloroethene	186
Tetrachloroethene	10.7
Trichloroethene	32.8
Vinyl chloride	9.2
(30 – 35)	
cis-1,2-Dichloroethene	744
trans-1,2-Dichloroethene	7.4
Tetrachloroethene	15.9
Trichloroethene	84.2
Vinyl chloride	41.8

TMP-7	Result
(30 – 35)	
cis-1,2-Dichloroethene	1300
trans-1,2-Dichloroethene	10.8
Tetrachloroethene	101
Trichloroethene	95
Vinyl chloride	76.9

MW-20	Result
Tetrachloroethene	23.5

TMP-9	Result
(4 – 6)	
cis-1,2-Dichloroethene	112
Tetrachloroethene	88.9
Trichloroethene	97.8
Vinyl chloride	5.8
(10 – 15)	
cis-1,2-Dichloroethene	6.6
Tetrachloroethene	57.2
Trichloroethene	13.4
(25 – 30)	
cis-1,2-Dichloroethene	1220
trans-1,2-Dichloroethene	29.2
Tetrachloroethene	279
Trichloroethene	619
Vinyl chloride	46.2
(30 – 35)	
cis-1,2-Dichloroethene	963
trans-1,2-Dichloroethene	14.1
Tetrachloroethene	45.9
Trichloroethene	259
Vinyl chloride	33

TMP-3	Result
(4 – 6)	
Tetrachloroethene	17.2
(15 – 20)	
cis-1,2-Dichloroethene	22.3
Tetrachloroethene	9.5
Trichloroethene	11.5
Vinyl chloride	3.1
(20 – 25)	
cis-1,2-Dichloroethene	68.2
Tetrachloroethene	8.9
Trichloroethene	12
Vinyl chloride	9.9

TMP-12	Result
(4 – 6)	
Xylene (total)	10.9
(10 – 15)	
Xylene (total)	9
(25 – 30)	
cis-1,2-Dichloroethene	269
Tetrachloroethene	120
Trichloroethene	97.9
Vinyl chloride	18.2
(30 – 35)	
cis-1,2-Dichloroethene	849
trans-1,2-Dichloroethene	8.2
Tetrachloroethene	140
Trichloroethene	127
Vinyl chloride	53.4

TMP-10	Result
(4 – 6)	
Tetrachloroethene	18.1
(15 – 20)	
cis-1,2-Dichloroethene	24.1
Tetrachloroethene	11.2
Trichloroethene	13.7
(25 – 30)	
cis-1,2-Dichloroethene	472
trans-1,2-Dichloroethene	7.9
Tetrachloroethene	352
Trichloroethene	162
Vinyl chloride	59
(30 – 35)	
cis-1,2-Dichloroethene	828
trans-1,2-Dichloroethene	7.3
Tetrachloroethene	333
Trichloroethene	111
Vinyl chloride	132

MW-1	Result
cis-1,2-Dichloroethene	30.8
Tetrachloroethene	7.7

MW-22	Result
Tetrachloroethene	15.6

Compound	TOGS GA AGWS
VOCs	
n-Butylbenzene	5
sec-Butylbenzene	5
cis-1,2-Dichloroethene	5
trans-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
p-Isopropyltoluene	5
n-Propylbenzene	5
Tetrachloroethene	5
Toluene	5
Trichloroethene	5
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
Vinyl chloride	2
m,p-Xylene	--
o-Xylene	5
Xylene (total)	5
SVOCs	
2,4-Dimethylphenol	1

FILE: /Users/shall/Desktop/Jordan/GW Exceedance.dwg DATE: 7/29/2020

Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY, 11096
BCP No. 130164

Figure 6

Groundwater Results (µg/L) above TOGS GA AWQS

July 2020

Project Number
10188-017

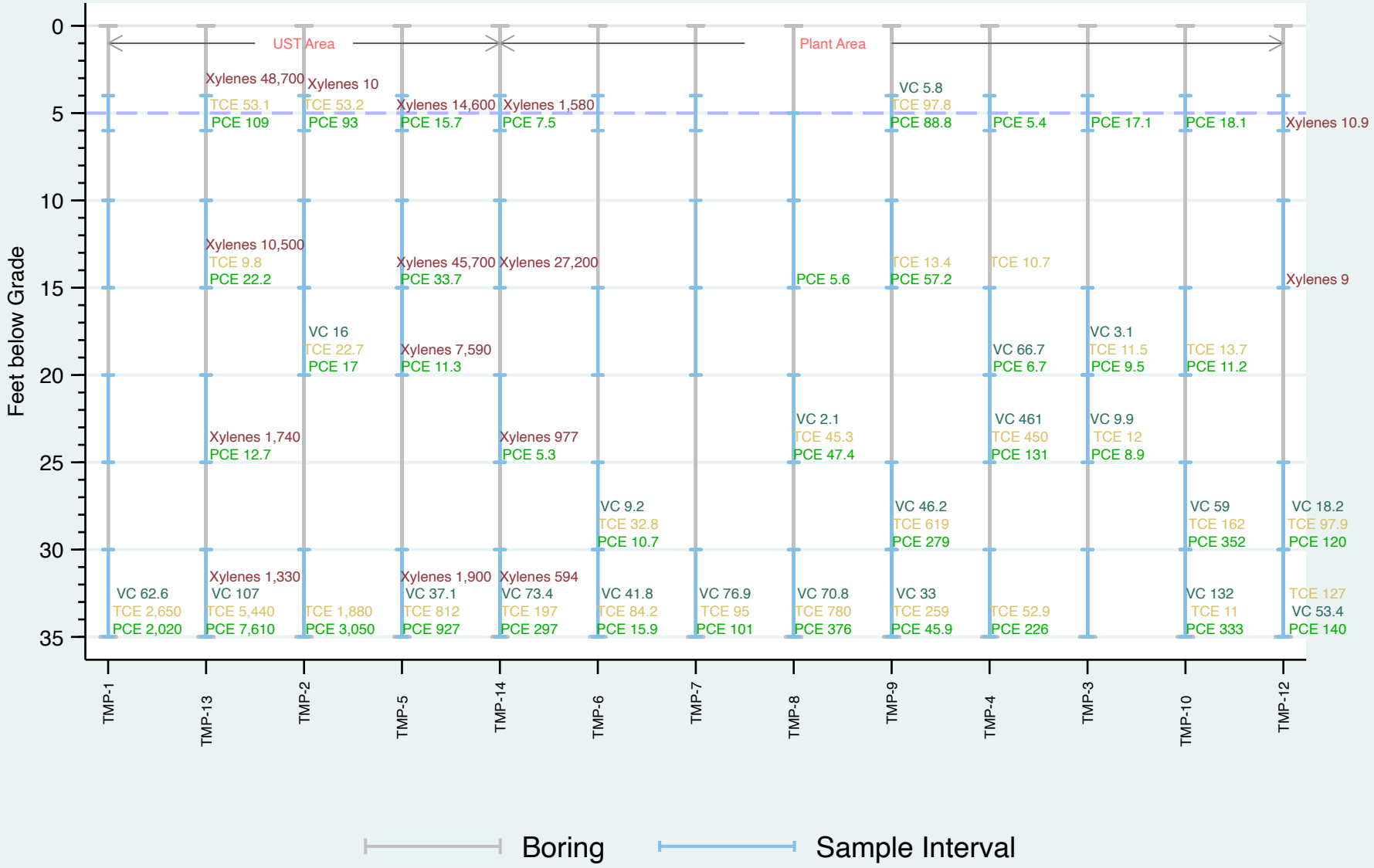
LEGEND

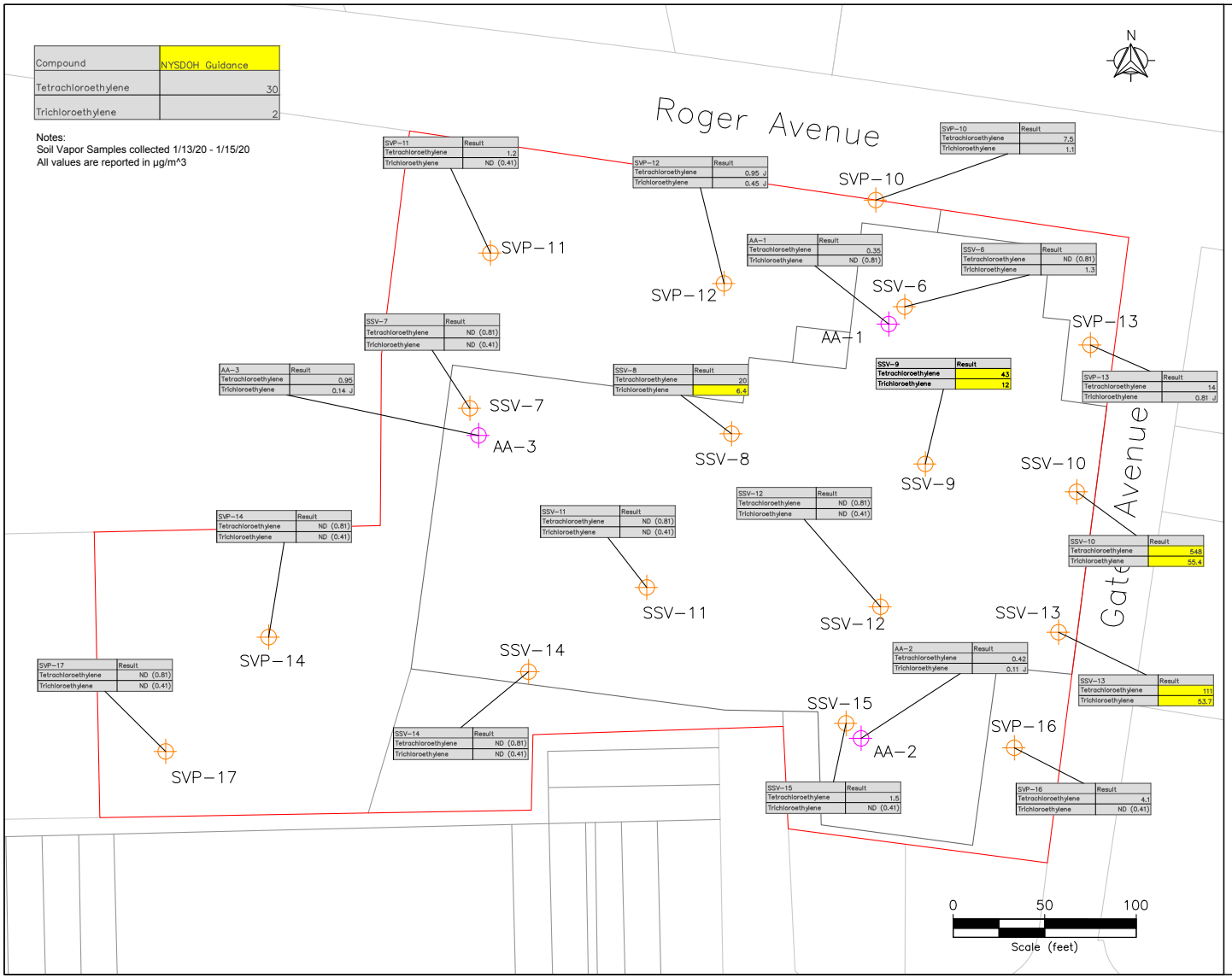
- Tax Lot Boundaries
- Former Warehouse Building and Room Outlines
- BCP Boundary
- Geophysical Anomalies
- Monitoring Well
- Temporary Monitoring Well
- (30 – 35) Sample Interval, ft. below grade

Notes:
All values are reported in µg/L
TOGS GA AWQS – Technical and Operational Guidance Series GA Ambient Water Quality Standards
All filtered metals belwo TOGS
Samples collected 1/9/20 – 1/10/20 and 5/21/20 – 5/29/20
Wells MW-8, MW-9, MW-13, MW-14, MW-15, MW-17 and MW-18 had no exceedances above TOGS GA AWQS
Where no specific TOGS criterion exists, the general guidance value was used.

Fig. 7 - Temp. Groundwater Sampling Intervals & Results above TOGS, µg/L

VOCs: PCE, TCE, Vinyl Chloride, & Xylenes





FILE: /Users/shall/Desktop/Jordan/soil vapor exceedance.dwg DATE: 7/29/2020

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY, 11096
BCP No. 130164

Figure 8

Soil Vapor PCE and TCE Results (µg/m^3)

July 2020

Project Number
10188-017

LEGEND

- Tax Lot Boundaries
- Former warehouse Building Outline
- BCP Boundary
- Soil Vapor/Sub-slab Sampling Location
- Ambient Air Sampling Location

Notes:
ND – Non-Detect
J – Estimated Value
Samples collected 1/13/20 – 1/15/20
All values reported in µg/m^3

TABLES

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Soil

Client Sample ID:	NY SCO Unrestricted Use (6	NY SCO - Restricted Residential	NY SCO - Commercial	HA-1 (1-2')	HA-2 (1-2')	HA-3 (1-2')	HA-4 (1-2')	HA-5(4-4.5)	HA-6 (1-2')	HA-7 (1-2')	HA-8 (1-2')	HA-9 (1-2')	HA-10 (1-2)	HA-11 (4-4.5')	HA-12 (1-2)	HA-13 (1-2)	HA-14 (1-2)
Lab Sample ID:	NYCRR 375-6	w/CP-51	w/CP-51	JD1592-1	JD1592-2	JD1592-3	JD1592-4	JD1645-1	JD1645-2	JD1645-3	JD1645-4	JD1645-5	JD1731-1	JD1731-2	JD1731-3	JD1731-4	JD1731-5
Date Sampled:	12/06)	(10/10) (6	(10/10) (6	1/13/2020	1/13/2020	1/13/2020	1/13/2020	1/14/2020	1/14/2020	1/14/2020	1/14/2020	1/14/2020	1/15/2020	1/15/2020	1/15/2020	1/15/2020	1/15/2020
Matrix:		NYCRR 375-6		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
MS Volatiles (SW846 8260C) - values reported in ug/kg																	
Acetone	50	100000	500000	ND (3.4)	ND (5.4)	ND (4.0)	ND (3.8)	ND (4.1)	ND (3.9)	ND (4.2)	ND (4.0)	ND (4.1)	ND (4.8)	ND (4.7)	ND (4.5)	ND (4.4)	ND (4.4)
Benzene	60	4800	44000	ND (0.39)	ND (0.61)	ND (0.46)	ND (0.43)	ND (0.46)	ND (0.44)	ND (0.47)	ND (0.45)	ND (0.47)	ND (0.54)	ND (0.53)	ND (0.51)	ND (0.50)	ND (0.50)
Bromochloromethane	-	-	-	ND (0.48)	ND (0.75)	ND (0.56)	ND (0.53)	ND (0.57)	ND (0.54)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.66)	ND (0.66)	ND (0.63)	ND (0.62)	ND (0.61)
Bromodichloromethane	-	-	-	ND (0.38)	ND (0.59)	ND (0.44)	ND (0.42)	ND (0.45)	ND (0.43)	ND (0.46)	1.0 J	ND (0.46)	3.3	1.8 J	1.9 J	2.0 J	1.6 J
Bromoform	-	-	-	ND (0.49)	ND (0.77)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.56)	ND (0.60)	ND (0.57)	ND (0.59)	ND (0.69)	ND (0.68)	ND (0.65)	ND (0.64)	ND (0.63)
Bromomethane	-	-	-	ND (0.85)	ND (1.3)	ND (1.0)	ND (0.95)	ND (1.0)	ND (0.97)	ND (1.0)	ND (0.98)	ND (1.0)	ND (1.2)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.1)
2-Butanone (MEK)	120	100000	500000	ND (3.2)	ND (5.0)	ND (3.7)	ND (3.6)	ND (3.8)	ND (3.6)	ND (3.9)	ND (3.7)	ND (3.9)	ND (4.4)	ND (4.4)	ND (4.2)	ND (4.1)	ND (4.1)
n-Butylbenzene	12000	100000	500000	ND (0.35)	ND (0.55)	ND (0.41)	ND (0.39)	ND (0.41)	ND (0.40)	ND (0.42)	ND (0.40)	ND (0.42)	ND (0.48)	ND (0.48)	ND (0.46)	ND (0.45)	ND (0.44)
sec-Butylbenzene	11000	100000	500000	ND (0.37)	ND (0.57)	ND (0.43)	ND (0.41)	ND (0.43)	ND (0.42)	ND (0.45)	ND (0.42)	ND (0.44)	ND (0.51)	ND (0.50)	ND (0.48)	ND (0.47)	ND (0.47)
tert-Butylbenzene	5900	100000	500000	ND (0.43)	ND (0.67)	ND (0.50)	ND (0.48)	ND (0.51)	ND (0.49)	ND (0.52)	ND (0.49)	ND (0.51)	ND (0.59)	ND (0.59)	ND (0.57)	ND (0.55)	ND (0.54)
Carbon disulfide	-			ND (0.80)	ND (1.2)	ND (0.93)	ND (0.88)	ND (0.94)	ND (0.90)	ND (0.97)	ND (0.92)	ND (0.96)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.0)	ND (1.0)
Carbon tetrachloride	760	2400	22000	ND (0.53)	ND (0.83)	ND (0.62)	ND (0.59)	ND (0.62)	ND (0.60)	ND (0.64)	ND (0.61)	ND (0.64)	ND (0.73)	ND (0.72)	ND (0.70)	ND (0.68)	ND (0.67)
Chlorobenzene	1100	100000	500000	ND (0.39)	ND (0.61)	ND (0.46)	ND (0.44)	ND (0.46)	ND (0.45)	ND (0.48)	ND (0.45)	ND (0.47)	ND (0.55)	ND (0.54)	ND (0.52)	ND (0.51)	ND (0.50)
Chloroethane	-			ND (0.51) [a]	ND (0.79) [a]	ND (0.59) [a]	ND (0.56) [a]	ND (0.60)	ND (0.57)	ND (0.61)	ND (0.58)	ND (0.61)	ND (0.70)	ND (0.69)	ND (0.67)	ND (0.65)	ND (0.64)
Chloroform	370	49000	350000	ND (0.42)	ND (0.66)	ND (0.49)	ND (0.47)	0.88 J	0.67 J	0.69 J	3.2	0.57 J	11.2	5	5.7	5.4	4.2
Chloromethane	-	-	-	ND (1.7)	ND (2.6)	ND (2.0)	ND (1.9)	ND (2.0)	ND (1.9)	ND (2.0)	ND (1.9)	ND (2.0)	ND (2.3)	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.1)
Cyclohexane	-	-	-	ND (0.56)	ND (0.88)	ND (0.66)	ND (0.63)	ND (0.66)	ND (0.64)	ND (0.68)	ND (0.65)	ND (0.68)	ND (0.78)	ND (0.77)	ND (0.74)	ND (0.73)	ND (0.72)
1,2-Dibromo-3-	-	-	-	ND (0.72)	ND (1.1)	ND (0.84)	ND (0.80)	ND (0.84)	ND (0.81)	ND (0.87)	ND (0.82)	ND (0.86)	ND (0.99)	ND (0.98)	ND (0.95)	ND (0.92)	ND (0.91)
Dibromochloromethane	-			ND (0.48)	ND (0.75)	ND (0.56)	ND (0.53)	ND (0.57)	ND (0.54)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.66)	ND (0.66)	ND (0.63)	ND (0.62)	ND (0.61)
1,2-Dibromoethane	-	-	-	ND (0.36)	ND (0.56)	ND (0.42)	ND (0.40)	ND (0.43)	ND (0.41)	ND (0.44)	ND (0.41)	ND (0.43)	ND (0.50)	ND (0.49)	ND (0.48)	ND (0.47)	ND (0.46)
1,2-Dichlorobenzene	1100	100000	500000	ND (0.47)	ND (0.73)	ND (0.55)	ND (0.52)	ND (0.55)	ND (0.53)	ND (0.57)	ND (0.54)	ND (0.56)	ND (0.65)	ND (0.64)	ND (0.62)	ND (0.60)	ND (0.59)
1,3-Dichlorobenzene	2400	49000	280000	ND (0.42)	ND (0.66)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.48)	ND (0.52)	ND (0.49)	ND (0.51)	ND (0.59)	ND (0.58)	ND (0.56)	ND (0.55)	ND (0.54)
1,4-Dichlorobenzene	1800	13000	130000	ND (0.42)	ND (0.66)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.48)	ND (0.51)	ND (0.49)	ND (0.51)	ND (0.59)	ND (0.58)	ND (0.56)	ND (0.55)	ND (0.54)
Dichlorodifluoromethan	-	-	-	ND (0.62)	ND (0.97)	ND (0.73)	ND (0.69)	ND (0.73) [a]	ND (0.71) [a]	ND (0.76) [a]	ND (0.72)	ND (0.75)	ND (0.86)	ND (0.85)	ND (0.82)	ND (0.80)	ND (0.79)
1,1-Dichloroethane	270	26000	240000	ND (0.42)	ND (0.66)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.48)	ND (0.51)	ND (0.49)	ND (0.51)	ND (0.59)	ND (0.58)	ND (0.56)	ND (0.55)	ND (0.54)
1,2-Dichloroethane	20	3100	30000	ND (0.40)	ND (0.63)	ND (0.47)	ND (0.45)	ND (0.47)	ND (0.46)	ND (0.49)	ND (0.46)	ND (0.48)	ND (0.56)	ND (0.55)	ND (0.53)	ND (0.52)	ND (0.51)
1,1-Dichloroethene	330	100000	500000	ND (0.56)	ND (0.88)	ND (0.66)	ND (0.62)	ND (0.66)	ND (0.64)	ND (0.68)	ND (0.65)	ND (0.67)	ND (0.78)	ND (0.77)	ND (0.74)	ND (0.72)	ND (0.71)
cis-1,2-Dichloroethene	250	100000	500000	ND (0.72)	ND (1.1)	ND (0.84)	ND (0.80)	ND (0.85)	ND (0.82)	ND (0.87)	ND (0.83)	ND (0.86)	ND (1.0)	ND (0.98)	ND (0.95)	ND (0.93)	ND (0.92)
trans-1,2-Dichloroethene	190	100000	500000	ND (0.52)	ND (0.82)	ND (0.61)	ND (0.58)	ND (0.62)	ND (0.59)	ND (0.64)	ND (0.60)	ND (0.63)	ND (0.73)	ND (0.72)	ND (0.69)	ND (0.67)	ND (0.67)
1,2-Dichloropropane	-			ND (0.41)	ND (0.63)	ND (0.47)	ND (0.45)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.47)	ND (0.49)	ND (0.56)	ND (0.55)	ND (0.53)	ND (0.52)	ND (0.52)
cis-1,3-Dichloropropene	-	-	-	ND (0.41)	ND (0.64)	ND (0.48)	ND (0.45)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.47)	ND (0.49)	ND (0.56)	ND (0.56)	ND (0.54)	ND (0.52)	ND (0.52)
trans-1,3-	-	-	-	ND (0.39)	ND (0.61)	ND (0.46)	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.48)	ND (0.45)	ND (0.47)	ND (0.54)	ND (0.54)	ND (0.52)	ND (0.50)	ND (0.50)
Ethylbenzene	1000	41000	390000	ND (0.47)	ND (0.74)	ND (0.55)	ND (0.53)	ND (0.56)	ND (0.54)	ND (0.57)	ND (0.54)	ND (0.57)	ND (0.66)	ND (0.65)	ND (0.62)	ND (0.61)	ND (0.60)
Freon 113	-			ND (0.87)	ND (1.4)	ND (1.0)	ND (0.96)	ND (1.0)	ND (0.98)	ND (1.1)	ND (1.0)	ND (1.0)	ND (1.2)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.1)
2-Hexanone	-	-	-	ND (1.8)	ND (2.8)	ND (2.1)	ND (2.0)	ND (2.1)	ND (2.1)	ND (2.2)	ND (2.1)	ND (2.2)	ND (2.5)	ND (2.5)	ND (2.4)	ND (2.3)	ND (2.3)
Isopropylbenzene	-			ND (0.60)	ND (0.93)	ND (0.70)	ND (0.66)	ND (0.70)	ND (0.68)	ND (0.72)	ND (0.69)	ND (0.72)	ND (0.83)	ND (0.82)	ND (0.79)	ND (0.77)	ND (0.76)
p-Isopropyltoluene	-			ND (0.34)	ND (0.53)	ND (0.40)	ND (0.38)	ND (0.40)	ND (0.38)	ND (0.41)	ND (0.39)	ND (0.41)	ND (0.47)	ND (0.46)	ND (0.45)	ND (0.44)	ND (0.43)
Methyl Acetate	-	-	-	ND (1.2)	ND (1.9)	ND (1.4)	ND (1.3)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.7) [c]	ND (1.6) [c]	ND (1.6)	ND (1.5)	ND (1.5)
Methylcyclohexane	-	-	-	ND (0.75)	ND (1.2)	ND (0.88)	ND (0.83)	ND (0.88)	ND (0.85)	ND (0.91)	ND (0.86)	ND (0.90)	ND (1.0)	ND (1.0)	ND (0.99)	ND (0.97)	ND (0.95)
Methyl Tert Butyl Ether	930	100000	500000	ND (0.40)	ND (0.63)	ND (0.47)	ND (0.45)	ND (0.47)	ND (0.46)	ND (0.49)	ND (0.46)	ND (0.48)	ND (0.56)	ND (0.55)	ND (0.53)	ND (0.52)	ND (0.51)
4-Methyl-2-	-			ND (1.9)	ND (3.0)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.4)	ND (2.2)	ND (2.3)	ND (2.7)	ND (2.7)	ND (2.6)	ND (2.5)	ND (2.5)
Methylene chloride	50	100000	500000	ND (2.1)	ND (3.3)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.6)	ND (2.5)	ND (2.6)	ND (3.0)	ND (2.9)	4.1 J	3.8 J	ND (2.7)
Naphthalene	12000	100000	500000	ND (2.1)	ND (3.3)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.6)	ND (2.5)	ND (2.6)	ND (3.0)	ND (2.9)	ND (2.8)	ND (2.8)	ND (2.7)
n-Propylbenzene	3900	100000	500000	ND (0.40)	ND (0.63)	ND (0.47)	ND (0.45)	ND (0.47)	ND (0.46)	ND (0.49)	ND (0.46)	ND (0.48)	ND (0.56)	ND (0.55)	ND (0.53)	ND (0.52)	ND (0.51)
Styrene	-			ND (0.49)	ND (0.77)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.56)	ND (0.60)	ND (0.57)	ND (0.59)	ND (0.68)	ND (0.67)	ND (0.65)	ND (0.64)	ND (0.63)
1,1,2,2-	-			ND (0.51)	ND (0.80)	ND (0.60)	ND (0.57)	ND (0.61)	ND (0.58)	ND (0.62)	ND (0.59)	ND (0.62)	ND (0.71)	ND (0.70)	ND (0.68)	ND (0.66)	ND (0.65)
Tetrachloroethene	1300	19000	150000	0.87 J	1.3 J	ND (0.58)	0.97 J	ND (0.59)	1.1 J	7.3	2.6	ND (0.60)	ND (0.69)	ND (0.68)	ND (0.66)	ND (0.64)	ND (0.63)
Toluene	700	100000	500000	ND (0.45)	ND (0.70)	ND (0.53)	ND (0.50)	ND (0.53)	ND (0.51)	ND (0.55)	ND (0.52)	ND (0.54)	ND (0.62)	ND (0.62)	ND (0.59)	ND (0.58)	ND (0.57)
1,2,3-Trichlorobenzene	-			ND (2.1)	ND (3.3)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.6)	ND (2.5)	ND (2.6)	ND (3.0)	ND (2.9)	ND (2.8)	ND (2.8)	ND (2.7)
1,2,4-Trichlorobenzene	-			ND (2.1)	ND (3.3)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.6)	ND (2.5)	ND (2.6)	ND (3.0)	ND (2.9)	ND (2.8)	ND (2.8)	ND (2.7)
1,1,1-Trichloroethane	680	100000	500000	ND (0.41)	ND (0.65)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.48)	ND (0.50)	ND (0.57)	ND (0.57)	ND (0.55)	ND (0.53)	ND (0.53)
1,1,2-Trichloroethane	-	-	-	ND (0.47)	ND (0.74)	ND (0.55)	ND (0.53)	ND (0.56)	ND (0.54)	ND (0.58)	ND (0.55)	ND (0.57)	ND (0.66)	ND (0.65)	ND (0.63)	ND (0.61)	ND (0.60)
Trichloroethene	470	21000	200000	ND (0.65)	ND (1.0)	ND (0.76)	ND (0.73)	ND (0.77)	ND (0.74)	ND (0.79)	ND (0.75)	ND (0.78)	ND (0.90)	ND (0.89)	ND (0.86)	ND (0.84)	ND (0.83)
Trichlorofluoromethane	-	-	-	ND (0.59)	ND (0.92)	ND (0.69)	ND (0.65)	ND (0.69)	ND (0.67)	ND (0.71)	ND (0.67)	ND (0.70)	ND (0.81)	ND (0.80)	ND (0.77)	ND (0.76)	ND (0.75)
1,2,4-Trimethylbenzene	3600	52000	190000	ND (0.54)	ND (0.85)	ND (0.64)	ND (0.60)	ND (0.64)	ND (0.62)	ND (0.66)	ND (0.63)	ND (0.65)	ND (0.75)	ND (0.74)	ND (0.72)	ND (0.70)	ND (0.69)
1,3,5-Trimethylbenzene	8400	52000	190000	ND (0.37)	ND (0.58)	ND (0.43)	ND (0.41)	ND (0.44)	ND (0.42)	ND (0.45)	ND (0.42)	ND (0.44)	ND (0.51)	ND (0.51)	ND (0.49)	ND (0.48)	ND (0.47)
Vinyl chloride	20	900	13000	ND (0.41)	ND (0.64)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.57)	ND (0.56)	ND (0.54)	ND (0.53)	ND (0.52)
m,p-Xylene	260	100000	500000	ND (0.77)	ND (1.2)	ND (0.90)	ND (0.85)	ND (0.91)	ND (0.87)	ND (0.93)	ND (0.88)	ND (0.92)	ND (1.1)	ND (1.1)	ND (1.0)	ND (0.99)	ND (0.98)
o-Xylene	260	100000	500000	ND (0.50)	ND (0.78)	ND (0.58)	ND (0.56)	ND (0.59)	ND (0.57)	ND (0.61)	ND (0.57)	ND (0.60)	ND (0.69)	ND (0.68)	ND (0.66)	ND (0.64)	ND (0.64)
Xylene (total)	260	100000	500000	ND (0.50)	ND (0.78)	ND (0.58)	ND (0.56)	ND (0.59)	ND (0.57)	ND (0.61)	ND (0.57)	ND (0.60)	ND (0.69)	ND (0.68)	ND (0.66)	ND (0.64)	ND (0.64)
Solids, Percent	%	%	%	89.8	79.4	94.2	90.5	83.9	91.8	87.4	90.6	93.4	95.7	92.7	96.1	96.3	95.6

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Soil

Client Sample ID: Lab Sample ID: Date Sampled: Matrix:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375 6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-1 (4-5) JD7490-1 5/20/2020 Soil	SB-1 (11-12) JD7495-2 5/20/2020 Soil	SB-1 (25-26) JD7490-5 5/20/2020 Soil	SB-1 (28.5-29.5) JD7495-3 5/20/2020 Soil	SB-1 (34-35) JD7490-6 5/20/2020 Soil	SB-2 (4-5) JD7490-7 5/20/2020 Soil	SB-2 (7-8) JD7490-8 5/20/2020 Soil	SB-2 (18-19) JD7490-9 5/20/2020 Soil	SB-2 (29-30) JD7490-11 5/20/2020 Soil	SB-2 (34-35) JD7490-12 5/20/2020 Soil	SB-3 (5-6) JD7623-4 5/22/2020 Soil	SB-3 (15-16) JD7490-24 5/22/2020 Soil	SB-3 (15-16) DUP JD7490-25 5/22/2020 Soil	SB-3 (34-35) JD7623-5 5/22/2020 Soil	SB-4 (5-6) JD7490-13 5/21/2020 Soil	SB-4 (7-8) JD7490-14 5/21/2020 Soil	SB-4 (15-16) JD7490-16 5/21/2020 Soil	SB-4 (30-31) JD7490-17 5/21/2020 Soil	SB-4 (34-35) JD7490-18 5/21/2020 Soil
MS Volatiles (SW846 8260C) - values reported in ug/kg																						
Acetone	50	100000	500000	ND (3.8)	31.4	**51.5**	20.4	20.9	ND (3.8)	25.9	ND (3.8)	31.6	39.2	ND (4.1)	ND (3.8)	ND (3.7)	14.8	ND (3.8)	ND (4.1)	8.1 J	15.8	6.5 J
Benzene	60	4800	44000	ND (0.43)	ND (0.48)	ND (0.46)	ND (0.45)	ND (0.45)	ND (0.43)	ND (0.46)	ND (0.44)	ND (0.46)	ND (0.53)	ND (0.47)	ND (0.43)	ND (0.42)	ND (0.57)	ND (0.43)	ND (0.46)	ND (0.48)	ND (0.52)	ND (0.47)
Bromochloromethane	-	-	-	ND (0.52)	ND (0.59)	ND (0.57)	ND (0.55)	ND (0.55)	ND (0.53)	ND (0.56)	ND (0.54)	ND (0.57)	ND (0.65)	ND (0.57)	ND (0.53)	ND (0.52)	ND (0.70)	ND (0.53)	ND (0.57)	ND (0.59)	ND (0.65)	ND (0.58)
Bromodichloromethane	-	-	-	ND (0.41)	ND (0.47)	ND (0.45)	ND (0.44)	ND (0.44)	ND (0.42)	ND (0.45)	ND (0.42)	ND (0.45)	ND (0.52)	ND (0.45)	ND (0.42)	ND (0.41)	ND (0.55)	ND (0.42)	ND (0.45)	ND (0.47)	ND (0.51)	ND (0.46)
Bromoform	-	-	-	ND (0.54)	ND (0.61)	ND (0.59)	ND (0.57)	ND (0.57)	ND (0.55)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.67)	ND (0.59)	ND (0.55)	ND (0.53)	ND (0.72)	ND (0.55)	ND (0.59)	ND (0.61)	ND (0.67)	ND (0.60)
Bromomethane	-	-	-	ND (0.93) [c]	ND (1.0)	ND (1.0)	ND (0.98) [c]	ND (0.98) [c]	ND (0.95) [c]	ND (1.0) [c]	ND (0.95)	ND (1.0)	ND (1.2) [c]	ND (1.0) [c]	ND (0.94) [c]	ND (0.92) [c]	ND (1.2) [c]	ND (0.95)	ND (1.0)	ND (1.0)	ND (1.1)	ND (1.0)
2-Butanone (MEK)	120	100000	500000	ND (3.5)	ND (3.9)	ND (3.8)	ND (3.7)	ND (3.7)	ND (3.6)	ND (3.8)	ND (3.6)	10.1	ND (4.4)	ND (3.8)	ND (3.5)	ND (3.5)	ND (4.7)	ND (3.6)	ND (3.8)	ND (3.9)	ND (4.3)	ND (3.9)
n-Butylbenzene	12000	100000	500000	ND (0.38)	0.58 J	ND (0.41)	ND (0.40)	ND (0.40)	ND (0.39)	ND (0.41)	ND (0.39)	ND (0.41)	ND (0.48)	ND (0.42)	ND (0.39)	ND (0.38)	ND (0.51)	ND (0.39)	ND (0.41)	ND (0.43)	ND (0.47)	ND (0.42)
sec-Butylbenzene	11000	100000	500000	ND (0.40)	0.76 J	0.49 J	ND (0.42)	ND (0.42)	ND (0.41)	ND (0.43)	ND (0.41)	ND (0.43)	ND (0.50)	ND (0.44)	ND (0.41)	ND (0.40)	ND (0.53)	ND (0.41)	ND (0.43)	ND (0.45)	ND (0.49)	ND (0.44)
tert-Butylbenzene	5900	100000	500000	ND (0.47)	ND (0.53)	2.8	ND (0.49)	ND (0.49)	ND (0.48)	ND (0.50)	ND (0.48)	ND (0.51)	ND (0.58)	ND (0.51)	ND (0.47)	ND (0.46)	ND (0.62)	ND (0.48)	ND (0.51)	ND (0.53)	ND (0.58)	ND (0.52)
Carbon disulfide	-			ND (0.87)	ND (0.98)	23	5	2.5	ND (0.88)	ND (0.94)	ND (0.89)	3.3	2.5	ND (0.95)	ND (0.88)	ND (0.86)	4.3	ND (0.89) [d]	ND (0.94) [d]	ND (0.98)	ND (1.1)	1.4 J
Carbon tetrachloride	760	2400	22000	ND (0.58)	ND (0.65)	ND (0.63)	ND (0.61)	ND (0.61)	ND (0.59)	ND (0.62)	ND (0.59)	ND (0.63)	ND (0.72)	ND (0.63)	ND (0.58)	ND (0.57)	ND (0.77)	ND (0.59)	ND (0.63)	ND (0.65)	ND (0.71)	ND (0.64)
Chlorobenzene	1100	100000	500000	ND (0.43)	ND (0.48)	ND (0.47)	ND (0.45)	ND (0.45)	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.47)	ND (0.54)	ND (0.47)	ND (0.43)	ND (0.43)	ND (0.57)	ND (0.44)	ND (0.47)	ND (0.48)	ND (0.53)	ND (0.48)
Chloroethane	-	-	-	ND (0.55)	ND (0.62)	ND (0.60)	ND (0.58)	ND (0.58)	ND (0.56)	ND (0.60)	ND (0.57)	ND (0.60)	ND (0.69)	ND (0.60)	ND (0.56)	ND (0.55)	ND (0.74)	ND (0.56)	ND (0.60)	ND (0.62)	ND (0.68)	ND (0.61)
Chloroform	370	49000	350000	ND (0.46)	ND (0.52)	ND (0.50)	ND (0.48)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.57)	ND (0.50)	ND (0.46)	ND (0.45)	ND (0.61)	ND (0.47)	ND (0.50)	ND (0.51)	ND (0.56)	ND (0.51)
Chloromethane	-	-	-	ND (1.8) [d]	ND (2.1)	ND (2.0)	ND (1.9) [d]	ND (1.9) [d]	ND (1.9) [d]	ND (2.0) [d]	ND (1.9)	ND (2.0)	ND (2.3) [d]	ND (2.0) [d]	ND (1.9) [d]	ND (1.8) [d]	ND (2.4) [d]	ND (1.9)	ND (2.0)	ND (2.1)	ND (2.3)	ND (2.0)
Cyclohexane	-	-	-	ND (0.61)	ND (0.69)	ND (0.67)	ND (0.65)	ND (0.65)	ND (0.62)	ND (0.66)	ND (0.63)	ND (0.67)	ND (0.77)	ND (0.67)	ND (0.62)	ND (0.61)	ND (0.82)	ND (0.63)	ND (0.67)	ND (0.69)	ND (0.76)	ND (0.68)
1,2-Dibromo-3-chloropropane	-	-	-	ND (0.78)	ND (0.88)	ND (0.85)	ND (0.82)	ND (0.83)	ND (0.79)	ND (0.84)	ND (0.80)	ND (0.85)	ND (0.98)	ND (0.85)	ND (0.79)	ND (0.77)	ND (1.0)	ND (0.80)	ND (0.85)	ND (0.88)	ND (0.96)	ND (0.87)
Dibromochloromethane	-			ND (0.52)	ND (0.59)	ND (0.57)	ND (0.55)	ND (0.55)	ND (0.53)	ND (0.56)	ND (0.54)	ND (0.57)	ND (0.65)	ND (0.57)	ND (0.53)	ND (0.52)	ND (0.70)	ND (0.53)	ND (0.57)	ND (0.59)	ND (0.65)	ND (0.58)
1,2-Dibromoethane	-	-	-	ND (0.39)	ND (0.44)	ND (0.43)	ND (0.42)	ND (0.42)	ND (0.40)	ND (0.42)	ND (0.40)	ND (0.43)	ND (0.49)	ND (0.43)	ND (0.40)	ND (0.39)	ND (0.53)	ND (0.40)	ND (0.43)	ND (0.44)	ND (0.49)	ND (0.44)
1,2-Dichlorobenzene	1100	100000	500000	ND (0.51)	ND (0.58)	ND (0.55)	ND (0.54)	ND (0.54)	ND (0.52)	ND (0.55)	ND (0.52)	ND (0.55)	ND (0.64)	ND (0.56)	ND (0.52)	ND (0.51)	ND (0.68)	ND (0.52)	ND (0.55)	ND (0.57)	ND (0.63)	ND (0.57)
1,3-Dichlorobenzene	2400	49000	280000	ND (0.46)	ND (0.52)	ND (0.50)	ND (0.49)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.58)	ND (0.51)	ND (0.47)	ND (0.46)	ND (0.62)	ND (0.47)	ND (0.50)	ND (0.52)	ND (0.57)	ND (0.51)
1,4-Dichlorobenzene	1800	13000	130000	ND (0.46)	ND (0.52)	ND (0.50)	ND (0.49)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.58)	ND (0.50)	ND (0.47)	ND (0.46)	ND (0.62)	ND (0.47)	ND (0.50)	ND (0.52)	ND (0.57)	ND (0.51)
Dichlorodifluoromethane	-	-	-	ND (0.68)	ND (0.77)	ND (0.74)	ND (0.72)	ND (0.72)	ND (0.69)	ND (0.73)	ND (0.70)	ND (0.74)	ND (0.85)	ND (0.74) [e]	ND (0.69) [e]	ND (0.67) [e]	ND (0.91) [e]	ND (0.69)	ND (0.74)	ND (0.77)	ND (0.84)	ND (0.75)
1,1-Dichloroethane	270	26000	240000	ND (0.46)	ND (0.52)	ND (0.50)	ND (0.49)	ND (0.49)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.50)	ND (0.58)	ND (0.51)	ND (0.47)	ND (0.46)	ND (0.62)	ND (0.47)	ND (0.50)	ND (0.52)	ND (0.57)	ND (0.51)
1,2-Dichloroethane	20	3100	30000	ND (0.44)	ND (0.50)	ND (0.48)	ND (0.46)	ND (0.46)	ND (0.45)	ND (0.47)	ND (0.45)	ND (0.48)	ND (0.55)	ND (0.48)	ND (0.44)	ND (0.44)	ND (0.59)	ND (0.45)	ND (0.48)	ND (0.49)	ND (0.54)	ND (0.49)
1,1-Dichloroethene	330	100000	500000	ND (0.61)	ND (0.69)	ND (0.66)	ND (0.65)	ND (0.65)	ND (0.62)	ND (0.66)	ND (0.63)	ND (0.66)	ND (0.77)	ND (0.67)	ND (0.62)	ND (0.61)	ND (0.82)	ND (0.63)	ND (0.66)	ND (0.69)	ND (0.75)	ND (0.68)
cis-1,2-Dichloroethene	250	100000	500000	ND (0.79)	ND (0.89)	53.6	75.5	101	ND (0.80)	ND (0.85)	3.4	43.5	22.2	ND (0.86)	ND (0.80)	ND (0.78)	13.1	ND (0.80)	ND (0.85)	107	3.9	ND (0.87)
trans-1,2-Dichloroethene	190	100000	500000	ND (0.57)	ND (0.64)	1.2	1.6	0.79 J	ND (0.58)	ND (0.62)	ND (0.58)	ND (0.62)	ND (0.71)	ND (0.62)	ND (0.58)	ND (0.57)	ND (0.76)	ND (0.58)	ND (0.62)	0.85 J	ND (0.70)	ND (0.63)
1,2-Dichloropropane	-			ND (0.44)	ND (0.50)	ND (0.48)	ND (0.47)	ND (0.47)	ND (0.45)	ND (0.48)	ND (0.45)	ND (0.48)	ND (0.55)	ND (0.48)	ND (0.45)	ND (0.44)	ND (0.59)	ND (0.45)	ND (0.48)	ND (0.50)	ND (0.55)	ND (0.49)
cis-1,3-Dichloropropene	-	-	-	ND (0.44)	ND (0.50)	ND (0.48)	ND (0.47)	ND (0.47)	ND (0.45)	ND (0.48)	ND (0.45)	ND (0.48)	ND (0.56)	ND (0.49)	ND (0.45)	ND (0.44)	ND (0.59)	ND (0.45)	ND (0.48)	ND (0.50)	ND (0.55)	ND (0.49)
trans-1,3-Dichloropropene	-	-	-	ND (0.43)	ND (0.48)	ND (0.46)	ND (0.45)	ND (0.45)	ND (0.43)	ND (0.46)	ND (0.44)	ND (0.46)	ND (0.53)	ND (0.47)	ND (0.43)	ND (0.42)	ND (0.57)	ND (0.44)	ND (0.46)	ND (0.48)	ND (0.53)	ND (0.47)
Ethylbenzene	1000	41000	390000	ND (0.52)	3.2	ND (0.56)	ND (0.54)	1	ND (0.52)	57.8	ND (0.53)	ND (0.56)	ND (0.65)	ND (0.56)	ND (0.52)	ND (0.51)	ND (0.69)	ND (0.53)	ND (0.56)	ND (0.58)	ND (0.64)	ND (0.57)
Freon 113	-			ND (0.95)	ND (1.1)	ND (1.0) [a]	ND (1.0)	ND (1.0)	ND (0.96)	ND (1.0)	ND (0.97)	ND (1.0)	ND (1.2)	ND (1.0)	ND (0.96)	ND (0.94)	ND (1.3)	ND (0.96)	ND (1.0)	ND (1.1) [a]	ND (1.2) [a]	ND (1.0) [a]
2-Hexanone	-	-	-	ND (2.0)	ND (2.2)	ND (2.2)	ND (2.1)	ND (2.1)	ND (2.0)	ND (2.1)	ND (2.0)	ND (2.1)	ND (2.5)	ND (2.2)	ND (2.0)	ND (2.0)	ND (2.6)	ND (2.0)	ND (2.2)	ND (2.2)	ND (2.4)	ND (2.2)
Isopropylbenzene	-			ND (0.65)	43.3	1.6 J	1.0 J	0.95 J	ND (0.66)	5.9	ND (0.67)	ND (0.71)	ND (0.81)	ND (0.71)	ND (0.66)	ND (0.65)	ND (0.87)	ND (0.67)	ND (0.71)	ND (0.73)	ND (0.80)	ND (0.72)
p-Isopropyltoluene	-			ND (0.37)	ND (0.42)	ND (0.40)	ND (0.39)	ND (0.39)	ND (0.38)	ND (0.40)	ND (0.38)	ND (0.40)	ND (0.46)	ND (0.40)	ND (0.37)	ND (0.37)	ND (0.49)	ND (0.38)	ND (0.40)	ND (0.42)	ND (0.46)	ND (0.41)
Methyl Acetate	-	-	-	ND (1.3)	ND (1.5)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.3)	ND (1.4)	ND (1.3)	ND (1.4)	ND (1.6)	ND (1.4)	ND (1.3)	ND (1.3)	ND (1.7)	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.6)	ND (1.4)
Methylcyclohexane	-	-	-	ND (0.82)	ND (0.92)	ND (0.89)	ND (0.86)	ND (0.87)	ND (0.83)	ND (0.88)	ND (0.84)	ND (0.89)	ND (1.0)	ND (0.89)	ND (0.83)	ND (0.81)	ND (1.1)	ND (0.84)	ND (0.89)	ND (0.92)	ND (1.0)	ND (0.91)
Methyl Tert Butyl Ether	930	100000	500000	ND (0.44)	ND (0.49)	ND (0.48)	ND (0.46)	ND (0.46)	ND (0.45)	ND (0.47)	ND (0.45)	0.74 J	ND (0.55)	ND (0.48)	ND (0.44)	ND (0.43)	ND (0.59)	ND (0.45)	ND (0.48)	ND (0.49)	ND (0.54)	ND (0.49)
4-Methyl-2-pentanone(MIBK)	-			ND (2.1)	ND (2.4)	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.7)	ND (2.3)	ND (2.1)	ND (2.1)	ND (2.8)	ND (2.2)	ND (2.3)	ND (2.4)	ND (2.6)	ND (2.4)
Methylene chloride	50	100000	500000	ND (2.3)	ND (2.6)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.9)	ND (2.6)	ND (2.4)	ND (2.3)	ND (3.1)	ND (2.4)	ND (2.5)	ND (2.6)	ND (2.9)	ND (2.6)
Naphthalene	12000	100000	500000	ND (2.3)	2.6 J	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.9)	ND (2.6)	ND (2.4)	ND (2.3)	ND (3.1)	ND (2.4)	ND (2.5)	ND (2.6)	ND (2.9)	ND (2.6)
n-Propylbenzene	3900	100000	500000	ND (0.44)	51.4	ND (0.48)	ND (0.46)	0.51 J	ND (0.45)	6.8	ND (0.45)	ND (0.48)	ND (0.55)	ND (0.48)	ND (0.44)	ND (0.44)	ND (0.59)	ND (0.45)	ND (0.48)	ND (0.49)	ND (0.54)	ND (0.49)
Styrene	-			ND (0.54)	ND (0.61)	ND (0.58)	ND (0.57)	ND (0.57)	ND (0.55)	ND (0.58)	ND (0.55)	ND (0.58)	ND (0.67)	ND (0.59)	ND (0.54)	ND (0.53)	ND (0.72)	ND (0.55)	ND (0.58)	ND (0.61)	ND (0.66)	ND (0.60)
1,1,2,2-Tetrachloroethane	-	-	-	ND (0.56)	ND (0.63)	ND (0.61)	ND (0.59)	ND (0.59)	ND (0.57)	ND (0.60)	ND (0.57)	ND (0.61)	ND (0.70)	ND (0.61)	ND (0.57)	ND (0.55)	ND (0.75)	ND (0.57)	ND (0.61)	ND (0.63)	ND (0.69)	ND (0.62)
Tetrachloroethene	1300	19000	150000	ND (0.54)	ND (0.61)	**2650**	**2810**	1080	1.3 J	ND (0.59)	ND (0.55)	**1760**	836	ND (0.59)	ND (0.55)	ND (0.54)	ND (0.72)	ND (0.55)	ND (0.59)	0.73 J	11.6	ND (0.60)
Toluene	700	100000	500000	2.2	4.1	ND (0.53)	2.6	3.9	5.2	2.9	0.77 J	6.2	ND (0.61)	ND (0.54)	ND (0.50)	ND (0.49)	ND (0.66)	0.91 J	3.2	ND (0.55)	3.4	0.79 J
1,2,3-Trichlorobenzene	-			ND (2.3)	ND (2.6)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.9)	ND (2.6)	ND (2.4)	ND (2.3)	ND (3.1)	ND (2.4)	ND (2.5)	ND (2.6)	ND (2.9)	ND (2.6)
1,2,4-Trichlorobenzene	-			ND (2.3)	ND (2.6)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.4)	ND (2.5)	ND (2.9)	ND (2.6)	ND (2.4)	ND (2.3)	ND (3.1)	ND (2.4)	ND (2.5)	ND (2.6)	ND (2.9)	ND (2.6)
1,1,1-Trichloroethane	680	100000	500000	ND (0.45)	ND (0.51)	ND (0.49)	ND (0.48)	ND (0.48)	ND (0.46)	ND (0.49)	ND (0.46)	ND (0.49)	ND (0.56)	ND (0.49)	ND (0.46)	ND (0.45)	ND (0.60)	ND (0.46)	ND (0.49)	ND (0.51)	ND (0.56)	ND (0.50)
1,1,2-Trichloroethane	-	-	-	ND (0.52)	ND (0.58)	ND (0.56)	ND (0.55)	ND (0.55)	ND (0.53)	ND (0.56)	ND (0.53)	ND (0.56)	ND (0.65)	ND (0.57)	ND (0.52)	ND (0.51)	ND (0.69)	ND (0.53)	ND (0.56)	ND (0.58)	ND (0.64)	ND (0.57)
Trichloroethene	470	21000	200000	ND (0.71)	ND (0.80)	**581**	**892**	299	ND (0.72)	ND (0.77)	ND (0.73)	157	198	ND (0.71)	ND (0.72)	ND (0.71)	ND (0.95)	0.80 J	ND (0.72)	ND (0.77)	2	ND (0.79)
Trichlorofluoromethane	-	-	-	ND (0.64)	ND (0.72)	ND (0.69)	ND (0.67)	ND (0.68)	ND (0.65)	ND (0.69)	ND (0.65)	ND (0.69)	ND (0.80)	ND (0.70)	ND (0.65)	ND (0.63)	ND (0.85)	ND (0.65)	ND (0.69)	ND (0.72)	ND (0.79)	ND (0.71)
1,2,4-Trimethylbenzene	3600	52000	190000	ND (0.59)	ND (0.67)	ND (0.64)	ND (0.63)	ND (0.63)	ND (0.60)	43.4	ND (0.61)	ND (0.64)	ND (0.74)	ND (0.65)	ND (0.60)	ND (0.59)	ND (0.79)	ND (0.61)	ND (0.64)	ND (0.67)	ND (0.73)	ND (0.66)
1,3,5-Trimethylbenzene	8400	52000	190000	ND (0.40)	ND (0.45)	ND (0.44)	ND (0.43)	ND (0.43)	ND (0.41)	2.9	ND (0.41)	ND (0.44)	ND (0.50)	ND (0.44)	ND (0.41)	ND (0.40)	ND (0.54)	ND (0.41)	ND (0.44)	ND (0.45)	ND (0.50)	ND (0.45)
Vinyl chloride	20	900	13000	ND (0.45)	ND (0.51)	0.83 J	1.1 J	1.8 J	ND (0.46)	ND (0.49)	ND (0.46)	1.7 J	0.64 J	ND (0.49)	ND (0.46)	ND (0.45)	1.2 J	ND (0.46)	ND (0.49)	4	ND (0.55)	ND (0.50)
m,p-Xylene	260	100000	500000	ND (0.84)	ND (0.94)	ND (0.91)	ND (0.88)	ND (0.89)	ND (0.85)	45.1	ND (0.86)	ND (0.91)	ND (1.0)	ND (0.92)	ND (0.85)	ND (0.83)	ND (1.1)	ND (0.86)	ND (0.91)	ND (0.94)	ND (1.0)	ND (0.93)
o-Xylene	260	100000	500000	ND (0.55)	ND (0.61)	ND (0.59)	0.58 J	ND (0.58)	ND (0.55)	1.9	ND (0.56)	ND (0.59)	ND (0.68)	ND (0.60)	ND (0.55)	ND (0.54)	ND (0.73)	ND (0.56)	ND (0.59)	ND (0.61)	ND (0.67)	ND (0.60)
Xylene (total)	260	100000	500000	ND (0.55)	ND (0.61)	ND (0.59)	0.58 J	ND (0.58)	ND (0.55)	47	ND (0.56)	ND (0.59)	ND (0.68)	ND (0.60)	ND (0.55)	ND (0.54)	ND (0.73)	ND (0.56)	ND (0.59)	ND (0.61)	ND (0.67)	ND (0.60)
Solids, Percent	%	%	%	87.6	76.5	79.2	80.8	85.7	92.3	84	81.7	83.6	80.7	75.6	85.2	85.7	82.9	85.8	83.5	81.9	72.3	81.7

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Soil

Client Sample ID: Lab Sample ID: Date Sampled: Matrix:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-5 (6-7) JD7642-14 5/29/2020 Soil	SB-5 (10-11) JD7642-16 5/29/2020 Soil	SB-5 (18-19) JD7642-17 5/29/2020 Soil	SB-5 (29-30) JD7642-18 5/29/2020 Soil	SB-5 (34-35) JD7642-19 5/29/2020 Soil	SB-5 (34-35) DUP JD7642-20 5/29/2020 Soil	SB-6 (5'-6') JD7642-1 5/27/2020 Soil	SB-6 (24'-25') JD7642-2 5/27/2020 Soil	SB-6 (34'-35') JD7642-3 5/27/2020 Soil	SB-7 (5-6) JD7623-6 5/26/2020 Soil	SB-7 (13-14) JD7623-7 5/26/2020 Soil	SB-7 (21-22) JD7623-9 5/26/2020 Soil	SB-7 (21-22) DUP JD7623-10 5/26/2020 Soil	SB-7 (23-24) JD7623-11 5/26/2020 Soil	SB-7 (34-35) JD7623-12 5/26/2020 Soil	SB-8 (5-6) JD7490-19 5/21/2020 Soil	SB-8 (10-11) JD7490-20 5/21/2020 Soil	SB-8 (11.5-12. JD7490-21 5/21/2020 Soil	SB-8 (18-19) JD7490-22 5/21/2020 Soil	SB-8 (34-35) JD7490-23 5/21/2020 Soil
MS Volatiles (SW846 8260C) - values reported in ug/kg																							
Acetone	50	100000	500000	ND (220)	11.9 J	ND (4.3)	ND (4.4)	9.8 J	11.4	4.7 J	33.4	33.7	23.4	ND (5.0)	5.1 J	ND (4.2)	ND (4.6)	ND (4.4)	ND (4.2)	ND (3.9)	ND (5.4)	ND (3.8)	ND (3.9)
Benzene	60	4800	44000	ND (25)	ND (0.52)	ND (0.49)	ND (0.50)	ND (0.49)	ND (0.46)	ND (0.51)	ND (0.46)	ND (0.44)	ND (0.44)	ND (0.57)	ND (0.46)	ND (0.47)	ND (0.52)	ND (0.50)	ND (0.48)	ND (0.44)	ND (0.62)	ND (0.43)	ND (0.44)
Bromochloromethane	-	-	-	ND (31)	ND (0.65)	ND (0.61)	ND (0.62)	ND (0.61)	ND (0.57)	ND (0.63)	ND (0.57)	ND (0.54)	ND (0.55)	ND (0.71)	ND (0.57)	ND (0.58)	ND (0.64)	ND (0.62)	ND (0.59)	ND (0.54)	ND (0.76)	ND (0.54)	ND (0.54)
Bromodichloromethane	-	-	-	ND (25)	ND (0.51)	ND (0.48)	ND (0.49)	ND (0.48)	ND (0.45)	ND (0.50)	ND (0.45)	ND (0.43)	ND (0.43)	ND (0.56)	ND (0.45)	ND (0.46)	ND (0.50)	ND (0.49)	ND (0.46)	ND (0.43)	ND (0.60)	ND (0.42)	ND (0.43)
Bromoform	-	-	-	ND (32)	ND (0.67)	ND (0.62)	ND (0.64)	ND (0.63)	ND (0.59)	ND (0.65)	ND (0.59)	ND (0.56)	ND (0.56)	ND (0.73)	ND (0.59)	ND (0.60)	ND (0.65)	ND (0.64)	ND (0.60)	ND (0.56)	ND (0.78)	ND (0.55)	ND (0.56)
Bromomethane	-	-	-	ND (55)	ND (1.1) [c]	ND (1.1) [c]	ND (1.1) [c]	ND (1.1) [c]	ND (1.0) [c]	ND (1.1)	ND (1.0)	ND (0.96)	ND (0.97) [c]	ND (1.3) [c]	ND (1.0) [c]	ND (1.0) [c]	ND (1.1) [c]	ND (1.1) [c]	ND (1.0)	ND (0.96)	ND (1.3)	ND (0.95)	ND (0.97)
2-Butanone (MEK)	120	100000	500000	ND (210)	ND (4.3)	ND (4.1)	ND (4.1)	ND (4.1)	ND (3.8)	ND (4.2)	ND (3.8)	ND (3.6)	ND (3.6)	ND (4.7)	ND (3.8)	ND (3.9)	ND (4.2)	ND (4.1)	ND (3.9)	ND (3.6)	ND (5.1)	ND (3.6)	ND (3.6)
n-Butylbenzene	12000	100000	500000	477	ND (0.47)	ND (0.44)	0.76 J	ND (0.44)	ND (0.41)	ND (0.46)	ND (0.41)	ND (0.39)	ND (0.40)	ND (0.51)	ND (0.41)	ND (0.42)	ND (0.46)	ND (0.45)	ND (0.43)	ND (0.39)	ND (0.55)	ND (0.39)	ND (0.39)
sec-Butylbenzene	11000	100000	500000	895	1.6 J	ND (0.46)	1.2 J	0.67 J	ND (0.43)	ND (0.48)	ND (0.43)	ND (0.41)	ND (0.42)	ND (0.54)	ND (0.44)	ND (0.45)	ND (0.49)	ND (0.47)	ND (0.45)	ND (0.41)	ND (0.58)	ND (0.41)	ND (0.42)
tert-Butylbenzene	5900	100000	500000	ND (28)	ND (0.58)	ND (0.54)	ND (0.55)	2.6	ND (0.51)	ND (0.56)	ND (0.51)	ND (0.48)	ND (0.49)	ND (0.63)	ND (0.51)	ND (0.52)	ND (0.57)	ND (0.55)	ND (0.52)	ND (0.48)	ND (0.68)	ND (0.48)	ND (0.49)
Carbon disulfide	-			ND (52)	ND (1.1)	ND (1.0)	ND (1.0)	5.4	4.2	ND (1.0)	2	1.4 J	1.4 J	ND (1.2)	ND (0.95)	ND (0.97)	ND (1.1)	ND (1.0)	ND (0.97) [d]	ND (0.89) [d]	ND (1.3) [d]	ND (0.89)	ND (0.90)
Carbon tetrachloride	760	2400	22000	ND (34)	ND (0.71)	ND (0.67)	ND (0.69)	ND (0.67)	ND (0.63)	ND (0.69)	ND (0.63)	ND (0.60)	ND (0.60)	ND (0.78)	ND (0.63)	ND (0.64)	ND (0.70)	ND (0.68)	ND (0.65)	ND (0.59)	ND (0.84)	ND (0.59)	ND (0.60)
Chlorobenzene	1100	100000	500000	ND (25)	ND (0.53)	ND (0.50)	ND (0.51)	ND (0.50)	ND (0.47)	ND (0.52)	ND (0.47)	ND (0.44)	ND (0.45)	ND (0.58)	ND (0.47)	ND (0.48)	ND (0.52)	ND (0.51)	ND (0.48)	ND (0.44)	ND (0.62)	ND (0.44)	ND (0.45)
Chloroethane	-			ND (33)	ND (0.68)	ND (0.64)	ND (0.66)	ND (0.64)	ND (0.60)	ND (0.66)	ND (0.60)	ND (0.57)	ND (0.58)	ND (0.74)	ND (0.60)	ND (0.62)	ND (0.67)	ND (0.65)	ND (0.62)	ND (0.57)	ND (0.80)	ND (0.56)	ND (0.57)
Chloroform	370	49000	350000	ND (27)	ND (0.56)	ND (0.53)	ND (0.54)	ND (0.53)	ND (0.50)	ND (0.55)	ND (0.50)	ND (0.47)	ND (0.48)	ND (0.62)	ND (0.50)	ND (0.51)	ND (0.55)	ND (0.54)	ND (0.51)	ND (0.47)	ND (0.66)	ND (0.47)	ND (0.47)
Chloromethane	-	-	-	ND (110)	ND (2.3)	ND (2.1)	ND (2.2)	ND (2.1)	ND (2.0)	ND (2.2) [d]	ND (2.0) [d]	ND (1.9) [d]	ND (1.9) [d]	ND (2.5) [d]	ND (2.0) [d]	ND (2.0) [d]	ND (2.2) [d]	ND (2.2) [d]	ND (2.1)	ND (1.9)	ND (2.7)	ND (1.9)	ND (1.9)
Cyclohexane	-	-	-	ND (36)	ND (0.76)	ND (0.71)	ND (0.73)	ND (0.71)	ND (0.67)	ND (0.74) [d]	ND (0.67) [d]	ND (0.63) [d]	ND (0.64)	ND (0.83)	ND (0.67)	ND (0.68)	ND (0.75)	ND (0.73)	ND (0.69)	ND (0.63)	ND (0.89)	ND (0.63)	ND (0.64)
1,2-Dibromo-3-chloropropane	-	-	-	ND (46)	ND (0.96)	ND (0.91)	ND (0.93)	ND (0.91)	ND (0.85)	ND (0.94)	ND (0.85)	ND (0.81)	ND (0.81)	ND (1.1)	ND (0.85)	ND (0.87)	ND (0.95)	ND (0.92)	ND (0.88)	ND (0.80)	ND (1.1)	ND (0.80)	ND (0.81)
Dibromochloromethane	-			ND (31)	ND (0.65)	ND (0.61)	ND (0.62)	ND (0.61)	ND (0.57)	ND (0.63)	ND (0.57)	ND (0.54)	ND (0.55)	ND (0.71)	ND (0.57)	ND (0.58)	ND (0.64)	ND (0.62)	ND (0.59)	ND (0.54)	ND (0.76)	ND (0.54)	ND (0.54)
1,2-Dibromoethane	-	-	-	ND (23)	ND (0.49)	ND (0.46)	ND (0.47)	ND (0.46)	ND (0.43)	ND (0.47)	ND (0.43)	ND (0.41)	ND (0.41)	ND (0.53)	ND (0.43)	ND (0.44)	ND (0.48)	ND (0.46)	ND (0.44)	ND (0.41)	ND (0.57)	ND (0.40)	ND (0.41)
1,2-Dichlorobenzene	1100	100000	500000	ND (30)	ND (0.63)	ND (0.59)	ND (0.61)	ND (0.59)	ND (0.55)	ND (0.61)	ND (0.55)	ND (0.53)	ND (0.53)	ND (0.69)	ND (0.56)	ND (0.57)	ND (0.62)	ND (0.60)	ND (0.57)	ND (0.53)	ND (0.74)	ND (0.52)	ND (0.53)
1,3-Dichlorobenzene	2400	49000	280000	ND (27)	ND (0.57)	ND (0.54)	ND (0.55)	ND (0.54)	ND (0.50)	ND (0.56)	ND (0.50)	ND (0.48)	ND (0.48)	ND (0.62)	ND (0.50)	ND (0.52)	ND (0.56)	ND (0.55)	ND (0.52)	ND (0.48)	ND (0.67)	ND (0.47)	ND (0.48)
1,4-Dichlorobenzene	1800	13000	130000	ND (27)	ND (0.57)	ND (0.53)	ND (0.55)	ND (0.54)	ND (0.50)	ND (0.55)	ND (0.50)	ND (0.48)	ND (0.48)	ND (0.62)	ND (0.50)	ND (0.51)	ND (0.56)	ND (0.55)	ND (0.52)	ND (0.48)	ND (0.67)	ND (0.47)	ND (0.48)
Dichlorodifluoromethane	-			ND (40) [a]	ND (0.84)	ND (0.79)	ND (0.81)	ND (0.79)	ND (0.74)	ND (0.82)	ND (0.74)	ND (0.70)	ND (0.71)	ND (0.92)	ND (0.74)	ND (0.76)	ND (0.82)	ND (0.80)	ND (0.76)	ND (0.70)	ND (0.98)	ND (0.69)	ND (0.71)
1,1-Dichloroethane	270	26000	240000	ND (27)	ND (0.57)	ND (0.54)	ND (0.55)	ND (0.54)	ND (0.50)	ND (0.56)	ND (0.50)	ND (0.48)	ND (0.48)	ND (0.62)	ND (0.50)	ND (0.52)	ND (0.56)	ND (0.55)	ND (0.52)	ND (0.48)	ND (0.67)	ND (0.47)	ND (0.48)
1,2-Dichloroethane	20	3100	30000	ND (26)	ND (0.54)	ND (0.51)	ND (0.52)	ND (0.51)	ND (0.48)	ND (0.53)	ND (0.48)	ND (0.45)	ND (0.46)	ND (0.59)	ND (0.48)	ND (0.49)	ND (0.53)	ND (0.52)	ND (0.49)	ND (0.45)	ND (0.64)	ND (0.45)	ND (0.46)
1,1-Dichloroethene	330	100000	500000	ND (36)	ND (0.76)	ND (0.71)	ND (0.73)	ND (0.71)	ND (0.66)	ND (0.74)	ND (0.66)	ND (0.63)	ND (0.64)	ND (0.82)	ND (0.67)	ND (0.68)	ND (0.74)	ND (0.72)	ND (0.69)	ND (0.63)	ND (0.89)	ND (0.63)	ND (0.64)
cis-1,2-Dichloroethene	250	100000	500000	ND (47)	8.7	ND (0.91)	ND (0.93)	12	17.1	ND (0.94)	7.8	67.5	ND (0.82)	1.2 J	ND (0.85)	ND (0.88)	ND (0.95)	ND (0.93)	ND (0.88)	ND (0.81)	ND (1.1)	ND (0.80)	7.7
trans-1,2-Dichloroethene	190	100000	500000	ND (34)	ND (0.70)	ND (0.66)	ND (0.68)	ND (0.66)	ND (0.62)	ND (0.69)	ND (0.62)	1.1	ND (0.60)	ND (0.77)	ND (0.62)	ND (0.64)	ND (0.69)	ND (0.67)	ND (0.64)	ND (0.59)	ND (0.83)	ND (0.58)	ND (0.59)
1,2-Dichloropropane	-			ND (26)	ND (0.55)	ND (0.51)	ND (0.52)	ND (0.51)	ND (0.48)	ND (0.53)	ND (0.48)	ND (0.46)	ND (0.46)	ND (0.60)	ND (0.48)	ND (0.49)	ND (0.54)	ND (0.52)	ND (0.50)	ND (0.46)	ND (0.64)	ND (0.45)	ND (0.46)
cis-1,3-Dichloropropene	-	-	-	ND (26)	ND (0.55)	ND (0.51)	ND (0.53)	ND (0.52)	ND (0.48)	ND (0.53)	ND (0.48)	ND (0.46)	ND (0.46)	ND (0.60)	ND (0.48)	ND (0.50)	ND (0.54)	ND (0.52)	ND (0.50)	ND (0.46)	ND (0.64)	ND (0.45)	ND (0.46)
trans-1,3-Dichloropropene	-	-	-	ND (25)	ND (0.53)	ND (0.49)	ND (0.51)	ND (0.50)	ND (0.46)	ND (0.51)	ND (0.46)	ND (0.44)	ND (0.45)	ND (0.58)	ND (0.46)	ND (0.48)	ND (0.52)	ND (0.50)	ND (0.48)	ND (0.44)	ND (0.62)	ND (0.44)	ND (0.44)
Ethylbenzene	1000	41000	390000	**72000**	163	ND (0.60)	39.6	ND (0.60)	ND (0.56)	ND (0.62)	ND (0.56)	ND (0.53)	ND (0.54)	ND (0.70)	ND (0.56)	ND (0.58)	ND (0.63)	ND (0.61)	ND (0.58)	ND (0.53)	ND (0.75)	ND (0.53)	ND (0.54)
Freon 113	-			ND (56)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.0)	ND (1.1)	ND (1.0)	ND (0.97)	ND (0.98)	ND (1.3)	ND (1.0)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (0.97)	ND (1.4)	ND (0.97) [a]	ND (0.98) [a]
2-Hexanone	-	-	-	ND (120)	ND (2.4)	ND (2.3)	ND (2.4)	ND (2.3)	ND (2.2)	ND (2.4)	ND (2.2)	ND (2.0)	ND (2.1)	ND (2.7)	ND (2.2)	ND (2.2)	ND (2.4)	ND (2.3)	ND (2.2)	ND (2.0)	ND (2.9)	ND (2.0)	ND (2.1)
Isopropylbenzene	-			14900	57.4	ND (0.75)	15.4	1.6 J	1.2 J	ND (0.78)	ND (0.71)	ND (0.67)	ND (0.68)	ND (0.88)	ND (0.71)	ND (0.73)	ND (0.79)	ND (0.77)	ND (0.73)	ND (0.71)	ND (0.94)	ND (0.67)	ND (0.68)
p-Isopropyltoluene	-			400	0.89 J	ND (0.43)	0.48 J	ND (0.43)	ND (0.40)	ND (0.44)	ND (0.40)	ND (0.38)	ND (0.38)	ND (0.50)	ND (0.40)	ND (0.41)	ND (0.45)	ND (0.44)	ND (0.41)	ND (0.38)	ND (0.53)	ND (0.38)	ND (0.38)
Methyl Acetate	-	-	-	ND (77)	ND (1.6)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.4)	ND (1.6)	ND (1.4)	ND (1.3)	ND (1.4)	ND (1.8)	ND (1.4)	ND (1.4)	ND (1.6)	ND (1.5)	ND (1.5)	ND (1.3)	ND (1.9)	ND (1.3)	ND (1.3)
Methylcyclohexane	-	-	-	144	ND (1.0)	ND (0.95)	ND (0.97)	ND (0.95)	ND (0.89)	ND (0.98)	ND (0.89)	ND (0.84)	ND (0.85)	ND (1.1)	ND (0.89)	ND (0.91)	ND (0.99)	ND (0.97)	ND (0.92)	ND (0.84)	ND (1.2)	ND (0.84)	ND (0.85)
Methyl Tert Butyl Ether	930	100000	500000	ND (26)	ND (0.54)	ND (0.51)	ND (0.52)	ND (0.51)	ND (0.48)	ND (0.53)	ND (0.48)	ND (0.45)	ND (0.46)	ND (0.59)	ND (0.48)	ND (0.49)	ND (0.53)	ND (0.52)	ND (0.49)	ND (0.45)	ND (0.63)	ND (0.45)	ND (0.45)
4-Methyl-2-pentanone(MIBK)	-			ND (130)	ND (2.6)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.3)	ND (2.5) [a]	ND (2.3) [a]	ND (2.2) [a]	ND (2.2)	ND (2.9)	ND (2.3)	ND (2.4)	ND (2.6)	ND (2.5)	ND (2.4)	ND (2.2)	ND (3.1)	ND (2.2)	ND (2.2)
Methylene chloride	50	100000	500000	ND (140)	ND (2.9)	ND (2.7)	ND (2.8)	ND (2.7)	ND (2.5)	ND (2.8)	ND (2.5)	ND (2.4)	ND (2.4)	ND (3.1)	ND (2.5)	ND (2.6)	ND (2.8)	ND (2.8)	ND (2.6)	ND (2.4)	ND (3.4)	ND (2.4)	ND (2.4)
Naphthalene	12000	100000	500000	504	10.6	ND (2.7)	ND (2.8)	ND (2.7)	ND (2.5)	ND (2.8)	ND (2.5)	ND (2.4)	ND (2.4)	ND (3.1)	ND (2.5)	ND (2.6)	ND (2.8)	ND (2.8)	ND (2.6)	ND (2.4)	ND (3.4)	ND (2.4)	ND (2.4)
n-Propylbenzene	3900	100000	500000	**34100**	106	ND (0.51)	34	1.4 J	0.88 J	ND (0.53)	ND (0.48)	ND (0.45)	ND (0.46)	ND (0.59)	ND (0.48)	ND (0.49)	ND (0.53)	ND (0.52)	ND (0.49)	ND (0.45)	ND (0.64)	ND (0.45)	ND (0.46)
Styrene	-			ND (32)	ND (0.66)	ND (0.62)	ND (0.64)	ND (0.62)	ND (0.58)	ND (0.65)	ND (0.58)	ND (0.55)	ND (0.56)	ND (0.72)	ND (0.59)	ND (0.60)	ND (0.65)	ND (0.63)	ND (0.60)	ND (0.55)	ND (0.78)	ND (0.55)	ND (0.56)
1,1,2,2-Tetrachloroethane	-			ND (33)	ND (0.69)	ND (0.65)	ND (0.66)	ND (0.65)	ND (0.61)	ND (0.67)	ND (0.61)	ND (0.58)	ND (0.58)	ND (0.75)	ND (0.61)	ND (0.62)	ND (0.68)	ND (0.66)	ND (0.63)	ND (0.58)	ND (0.81)	ND (0.57)	ND (0.58)
Tetrachloroethene	1300	19000	150000	790	ND (0.67)	ND (0.63)	1.7 J	809	779	ND (0.65)	ND (0.59)	21.9	ND (0.56)	ND (0.73)	ND (0.59)	ND (0.60)	0.67 J	3.8	ND (0.61)	2.1	4.5	ND (0.55)	28
Toluene	700	100000	500000	**6150**	138	ND (0.57)	4.1	ND (0.57)	ND (0.53)	ND (0.59)	ND (0.53)	ND (0.51)	ND (0.51)	ND (0.66)	ND (0.53)	ND (0.55)	ND (0.60)	ND (0.58)	1.1	2	4.2	3.5	0.72 J
1,2,3-Trichlorobenzene	-			ND (140)	ND (2.9)	ND (2.7)	ND (2.8)	ND (2.7)	ND (2.5)	ND (2.8)	ND (2.5)	ND (2.4)	ND (2.4)	ND (3.1)	ND (2.5)	ND (2.6)	ND (2.8)	ND (2.8)	ND (2.6)	ND (2.4)	ND (3.4)	ND (2.4)	ND (2.4)
1,2,4-Trichlorobenzene	-			ND (140)	ND (2.9)	ND (2.7)	ND (2.8)	ND (2.7)	ND (2.5)	ND (2.8)	ND (2.5)	ND (2.4)	ND (2.4)	ND (3.1)	ND (2.5)	ND (2.6)	ND (2.8)	ND (2.8)	ND (2.6)	ND (2.4)	ND (3.4)	ND (2.4)	ND (2.4)
1,1,1-Trichloroethane	680	100000	500000	ND (27)	ND (0.56)	ND (0.52)	ND (0.54)	ND (0.52)	ND (0.49)	ND (0.54)	ND (0.49)	ND (0.47)	ND (0.47)	ND (0.61)	ND (0.49)	ND (0.50)	ND (0.55)	ND (0.53)	ND (0.51)	ND (0.46)	ND (0.65)	ND (0.46)	ND (0.47)
1,1,2-Trichloroethane	-	-	-	ND (31)	ND (0.64)	ND (0.60)	ND (0.61)	ND (0.60)	ND (0.56)	ND (0.62)	ND (0.56)	ND (0.53)	ND (0.54)	ND (0.70)	ND (0.56)	ND (0.58)	ND (0.63)	ND (0.61)	ND (0.58)	ND (0.53)	ND (0.75)	ND (0.53)	ND (0.54)
Trichloroethene	470	21000	200000	ND (42)	ND (0.88)	ND (0.83)	ND (0.85)	100	97.6	ND (0.86)	ND (0.77)	13.1	ND (0.74)	ND (0.96)	ND (0.78)	ND (0.79)	ND (0.86)	1.2	ND (0.80)	ND (0.73)	ND (1.0)	ND (0.73)	17.4
Trichlorofluoromethane	-	-	-	ND (38)	ND (0.79)	ND (0.74)	ND (0.76)	ND (0.74)	ND (0.69)	ND (0.77)	ND (0.69)	ND (0.66)	ND (0.67)	ND (0.86)	ND (0.70)	ND (0.71)	ND (0.78)	ND (0.75)	ND (0.72)	ND (0.66)	ND (0.93)	ND (0.65)	ND (0.66)
1,2,4-Trimethylbenzene	3600	52000	190000	**94700**	238	ND (0.69)	100	ND (0.69)	0.94 J	ND (0.71)	ND (0.64)	ND (0.61)	ND (0.62)	ND (0.80)	ND (0.65)	ND (0.66)	ND (0.72)	ND (0.70)	ND (0.67)	ND (0.61)	ND (0.86)	ND (0.61)	ND (0.62)
1,3,5-Trimethylbenzene	8400	52000	190000	**37500**	129	ND (0.47)	36.8	ND (0.47)	1.0 J	ND (0.48)	ND (0.44)	ND (0.42)	ND (0.42)	ND (0.54)	ND (0.44)	ND (0.45)	ND (0.49)	ND (0.48)	ND (0.45)	ND (0.41)	ND (0.58)	ND (0.41)	ND (0.42)
Vinyl chloride	20	900	13000	ND (27)	ND (0.55)	ND (0.52)	ND (0.53)	ND (0.52)	ND (0.49)	ND (0.54)	ND (0.49)	1.8 J	ND (0.47)	ND (0.61)	ND (0.49)	ND (0.50)	ND (0.55)	ND (0.53)	ND (0.50)	ND (0.46)	ND (0.65)	ND (0.46)	ND (0.47)
m,p-Xylene	260	100000	500000	**280000**	**638**	ND (0.97)	142	ND (0.97)	0.96 J	ND (1.0)	ND (0.91)	ND (0.86)	ND (0.87)	ND (1.1)	ND (0.91)	ND (0.93)	ND (1.0)	ND (0.99)	ND (0.94)	ND (0.86)	ND (1.2)	ND (0.86)	ND (0.87)
o-Xylene	260	100000	500000	**74200**	162	ND (0.63)	37	1.2	ND (0.59)	ND (0.65)	ND (0.59)	ND (0.56)	ND (0.57)	ND (0.73)	ND (0.59)	ND (0.61)	ND (0.66)	ND (0.64)	ND (0.61)	ND (0.56)	ND (0.79)	ND (0.56)	ND (0.57)
Xylene (total)	260	100000	500000	**354000**	**800**	ND (0.63)	179	1.2	0.96 J	ND (0.65)	ND (0.59)	ND (0.56)	ND (0.57)	ND (0.73)	ND (0.59)	ND (0.61)	ND (0.66)	ND (0.64)	ND (0.61)	ND (0.56)	ND (0.79)	ND (0.56)	ND (0.57)
Solids, Percent	%	%	%	83.9	73.5	81	76.4	76.7	78.2	81	79.5	85.1	82.8	70.9	81.9	82.7	77.3	75.5	82.3	82.5	71.1	84.4	79.3

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in h
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control lim

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Soil

Client Sample ID: Lab Sample ID: Date Sampled: Matrix:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-9 (7-8) JD7623-1 5/22/2020 Soil	SB-9 (24-25) JD7623-2 5/22/2020 Soil	SB-9 (34-35) JD7623-3 5/22/2020 Soil	SB-10 (5-6) JD7623-14 5/26/2020 Soil	SB-10 (26-27) JD7623-16 5/26/2020 Soil	SB-10 (34-35) JD7623-17 5/26/2020 Soil	SB-11 (5-6) JD7642-21 5/29/2020 Soil	SB-11 (13-14) JD7642-22 5/29/2020 Soil	SB-12 (5-6) JD7642-11 5/28/2020 Soil	SB-12 (14-15) JD7642-12 5/28/2020 Soil	SB-12 (34-35) JD7642-13 5/28/2020 Soil	SB-13 (5-6) JD7642-4 5/28/2020 Soil	SB-13 (10-11) JD7642-5 5/28/2020 Soil	SB-13 (13'-14') JD7642-7 5/28/2020 Soil	SB-13 (21'-22') JD7642-9 5/28/2020 Soil	SB-13 (28'-29') JD7642-10 5/28/2020 Soil	SB-14 (6-7) JD7623-18 5/27/2020 Soil	SB-14 (11-12) JD7623-19 5/27/2020 Soil	SB-14 (22-23) JD7623-21 5/27/2020 Soil	SB-14 (29-30) JD7623-22 5/27/2020 Soil	SB-14 (34-35) JD7623-23 5/27/2020 Soil
MS Volatiles (SW846 8260C) - values reported in ug/kg																								
Acetone	50	100000	500000	ND (4.5)	ND (4.4)	18.3	ND (4.5)	25	21.1	ND (4.3)	ND (4.6)	5.4 J	8.7 J	18.2	ND (240)	ND (280)	ND (330)	5.6 J	8.6 J	44.5	ND (300)	5.3 J	40.8	31.8
Benzene	60	4800	44000	ND (0.51)	ND (0.50)	ND (0.47)	ND (0.51)	ND (0.48)	ND (0.43)	ND (0.48)	ND (0.52)	ND (0.48)	ND (0.52)	ND (0.46)	ND (28)	ND (32)	ND (37)	ND (0.46)	ND (0.48)	ND (0.49)	ND (34)	ND (0.46)	ND (0.42)	ND (0.49)
Bromochloromethane	-	-	-	ND (0.62)	ND (0.61)	ND (0.58)	ND (0.63)	ND (0.59)	ND (0.54)	ND (0.60)	ND (0.64)	ND (0.59)	ND (0.64)	ND (0.56)	ND (34)	ND (39)	ND (46)	ND (0.57)	ND (0.59)	ND (0.60)	ND (42)	ND (0.56)	ND (0.52)	ND (0.61)
Bromodichloromethane	-	-	-	ND (0.49)	ND (0.49)	ND (0.46)	ND (0.50)	ND (0.47)	ND (0.42)	ND (0.47)	ND (0.50)	ND (0.47)	ND (0.51)	ND (0.44)	ND (27)	ND (31)	ND (36)	ND (0.45)	ND (0.47)	ND (0.47)	ND (33)	ND (0.45)	ND (0.41)	ND (0.48)
Bromoform	-	-	-	ND (0.64)	ND (0.63)	ND (0.60)	ND (0.65)	ND (0.61)	ND (0.55)	ND (0.61)	ND (0.66)	ND (0.61)	ND (0.66)	ND (0.58)	ND (35)	ND (40)	ND (47)	ND (0.58)	ND (0.61)	ND (0.62)	ND (43)	ND (0.58)	ND (0.54)	ND (0.63)
Bromomethane	-	-	-	ND (1.1) [c]	ND (1.1) [c]	ND (1.0) [c]	ND (1.1) [c]	ND (1.0) [c]	ND (0.95) [c]	ND (1.1) [c]	ND (1.1) [c]	ND (1.1)	ND (1.1)	ND (1.0)	ND (60)	ND (70)	ND (81)	ND (1.0)	ND (1.1)	ND (1.1)	ND (75)	ND (1.0)	ND (0.93)	ND (1.1)
2-Butanone (MEK)	120	100000	500000	ND (4.2)	ND (4.1)	ND (3.9)	ND (4.2)	ND (3.9)	ND (3.6)	ND (4.0)	ND (4.2)	ND (3.9)	ND (4.3)	ND (3.7)	ND (230)	ND (260)	ND (300)	ND (3.8)	ND (4.0)	ND (4.0)	ND (280)	ND (3.8)	ND (3.5)	ND (4.1)
n-Butylbenzene	12000	100000	500000	ND (0.45)	ND (0.45)	ND (0.42)	ND (0.46)	ND (0.43)	ND (0.39)	ND (0.43)	ND (0.46)	ND (0.43)	ND (0.47)	ND (0.41)	135	33.5 J	ND (33)	ND (0.41)	ND (0.43)	ND (0.44)	ND (30)	ND (0.41)	ND (0.38)	ND (0.44)
sec-Butylbenzene	11000	100000	500000	ND (0.48)	ND (0.47)	ND (0.44)	ND (0.48)	ND (0.45)	ND (0.41)	ND (0.46)	ND (0.49)	ND (0.45)	ND (0.49)	ND (0.43)	112 J	30.4 J	ND (35)	ND (0.43)	ND (0.45)	ND (0.46)	ND (32)	ND (0.43)	ND (0.40)	ND (0.46)
tert-Butylbenzene	5900	100000	500000	ND (0.56)	ND (0.55)	ND (0.52)	ND (0.57)	ND (0.53)	ND (0.48)	ND (0.53)	ND (0.57)	ND (0.53)	ND (0.57)	ND (0.50)	ND (30)	ND (35)	ND (41)	ND (0.51)	0.85 J	ND (0.54)	ND (37)	ND (0.50)	0.58 J	ND (0.54)
Carbon disulfide	-			ND (1.0)	ND (1.0)	3.7	ND (1.1)	7.8	7.3	ND (0.99)	ND (1.1)	ND (0.98)	ND (1.1)	5.8	ND (56)	ND (65)	ND (76)	ND (0.94)	ND (0.98)	2.0 J	ND (70)	ND (0.93)	15.4	5.1
Carbon tetrachloride	760	2400	22000	ND (0.69)	ND (0.68)	ND (0.64)	ND (0.70)	ND (0.65)	ND (0.59)	ND (0.66)	ND (0.70)	ND (0.65)	ND (0.71)	ND (0.62)	ND (37)	ND (43)	ND (50)	ND (0.63)	ND (0.65)	ND (0.66)	ND (46)	ND (0.62)	ND (0.57)	ND (0.67)
Chlorobenzene	1100	100000	500000	ND (0.51)	ND (0.50)	ND (0.47)	ND (0.52)	ND (0.48)	ND (0.44)	ND (0.49)	ND (0.52)	ND (0.48)	ND (0.53)	ND (0.46)	ND (28)	ND (32)	ND (37)	ND (0.47)	ND (0.49)	ND (0.49)	ND (34)	ND (0.46)	ND (0.43)	ND (0.50)
Chloroethane	-	-	-	ND (0.66)	ND (0.65)	ND (0.61)	ND (0.67)	ND (0.62)	ND (0.56)	ND (0.63)	ND (0.67)	ND (0.62)	ND (0.68)	ND (0.59)	ND (36)	ND (41)	ND (48)	ND (0.60)	ND (0.63)	ND (0.63)	ND (44)	ND (0.59)	ND (0.55)	ND (0.64)
Chloroform	370	49000	350000	ND (0.55)	ND (0.54)	ND (0.50)	ND (0.55)	ND (0.52)	ND (0.47)	ND (0.52)	ND (0.56)	ND (0.52)	ND (0.56)	ND (0.49)	ND (30)	ND (34)	ND (40)	ND (0.50)	ND (0.52)	ND (0.52)	ND (37)	ND (0.49)	ND (0.45)	ND (0.53)
Chloromethane	-	-	-	ND (2.2) [d]	ND (2.1) [d]	ND (2.0) [d]	ND (2.2) [d]	ND (2.1) [d]	ND (1.9) [d]	ND (2.1)	ND (2.2)	ND (2.1) [d]	ND (2.2)	ND (2.0) [d]	ND (120)	ND (140)	ND (160)	ND (2.0) [d]	ND (2.1) [d]	ND (2.1)	ND (150)	ND (2.0)	ND (1.8)	ND (2.1)
Cyclohexane	-	-	-	ND (0.73)	ND (0.72)	ND (0.68)	ND (0.74)	ND (0.69)	ND (0.63)	ND (0.70)	ND (0.75)	ND (0.69) [d]	ND (0.75)	ND (0.66) [d]	ND (40)	ND (46)	ND (53)	ND (0.67) [d]	ND (0.70) [d]	ND (0.70)	ND (49)	ND (0.66)	ND (0.61)	ND (0.71)
1,2-Dibromo-3-chloropropane	-	-	-	ND (0.93)	ND (0.92)	ND (0.86)	ND (0.95)	ND (0.88)	ND (0.80)	ND (0.89)	ND (0.95)	ND (0.88)	ND (0.96)	ND (0.84)	ND (51)	ND (59)	ND (68)	ND (0.85)	ND (0.88)	ND (0.90)	ND (63)	ND (0.84)	ND (0.78)	ND (0.91)
Dibromochloromethane	-			ND (0.62)	ND (0.61)	ND (0.58)	ND (0.63)	ND (0.59)	ND (0.54)	ND (0.60)	ND (0.64)	ND (0.59)	ND (0.64)	ND (0.56)	ND (34)	ND (39)	ND (46)	ND (0.57)	ND (0.59)	ND (0.60)	ND (42)	ND (0.56)	ND (0.52)	ND (0.61)
1,2-Dibromoethane	-	-	-	ND (0.47)	ND (0.46)	ND (0.43)	ND (0.48)	ND (0.44)	ND (0.40)	ND (0.45)	ND (0.48)	ND (0.44)	ND (0.48) [b]	ND (0.42)	ND (25)	ND (30)	ND (34)	ND (0.43)	ND (0.45)	ND (0.45) [b]	ND (31)	ND (0.42) b	ND (0.39) b	ND (0.46) b
1,2-Dichlorobenzene	1100	100000	500000	ND (0.61)	ND (0.60)	ND (0.56)	ND (0.62)	ND (0.58)	ND (0.52)	ND (0.58)	ND (0.62)	ND (0.58)	ND (0.63)	ND (0.55)	ND (33)	ND (38)	ND (44)	ND (0.55)	ND (0.58)	ND (0.58)	ND (41)	ND (0.55)	ND (0.51)	ND (0.59)
1,3-Dichlorobenzene	2400	49000	280000	ND (0.55)	ND (0.54)	ND (0.51)	ND (0.56)	ND (0.52)	ND (0.47)	ND (0.53)	ND (0.56)	ND (0.52)	ND (0.57)	ND (0.50)	ND (30)	ND (35)	ND (40)	ND (0.50)	ND (0.52)	ND (0.53)	ND (37)	ND (0.50)	ND (0.46)	ND (0.54)
1,4-Dichlorobenzene	1800	13000	130000	ND (0.55)	ND (0.54)	ND (0.51)	ND (0.56)	ND (0.52)	ND (0.47)	ND (0.53)	ND (0.56)	ND (0.52)	ND (0.57)	ND (0.49)	ND (30)	ND (35)	ND (40)	ND (0.50)	ND (0.52)	ND (0.53)	ND (37)	ND (0.50)	ND (0.46)	ND (0.54)
Dichlorodifluoromethane	-	-	-	ND (0.81) [e]	ND (0.80) [e]	ND (0.75) [e]	ND (0.82)	ND (0.77)	ND (0.69)	ND (0.77)	ND (0.83)	ND (0.77)	ND (0.83)	ND (0.73)	ND (44)	ND (51)	ND (59)	ND (0.74)	ND (0.77)	ND (0.78)	ND (54)	ND (0.73)	ND (0.68)	ND (0.79)
1,1-Dichloroethane	270	26000	240000	ND (0.55)	ND (0.54)	ND (0.51)	ND (0.56)	ND (0.52)	ND (0.47)	ND (0.53)	ND (0.56)	ND (0.52)	ND (0.57)	ND (0.50)	ND (30)	ND (35)	ND (40)	ND (0.50)	ND (0.52)	ND (0.53)	ND (37)	ND (0.50)	ND (0.46)	ND (0.54)
1,2-Dichloroethane	20	3100	30000	ND (0.52)	ND (0.52)	ND (0.49)	ND (0.53)	ND (0.50)	ND (0.45)	ND (0.50)	ND (0.53)	ND (0.50)	ND (0.54)	ND (0.47)	ND (28)	ND (33)	ND (38)	ND (0.48)	ND (0.50)	ND (0.50)	ND (35)	ND (0.47)	ND (0.44)	ND (0.51)
1,1-Dichloroethene	330	100000	500000	ND (0.73)	ND (0.72)	ND (0.68)	ND (0.74)	ND (0.69)	ND (0.63)	ND (0.70)	ND (0.74)	ND (0.69)	ND (0.75)	ND (0.66)	ND (40)	ND (46)	ND (53)	ND (0.66)	ND (0.69)	ND (0.70)	ND (49)	ND (0.66)	ND (0.61)	ND (0.71)
cis-1,2-Dichloroethene	250	100000	500000	ND (0.94)	93	79.1	ND (0.95)	54.5	122	ND (0.89)	ND (0.95)	ND (0.89)	16.5	39.2	ND (51)	92.6	**264**	ND (0.85)	3.7	ND (0.90)	ND (63)	ND (0.84)	34.7	57.2
trans-1,2-Dichloroethene	190	100000	500000	ND (0.68)	0.88 J	6.1	ND (0.69)	1.7	1.2	ND (0.65)	ND (0.69)	ND (0.64)	ND (0.70)	ND (0.61)	ND (37)	ND (43)	ND (50)	ND (0.62)	ND (0.65)	ND (0.65)	ND (46)	ND (0.61)	1.4	ND (0.66)
1,2-Dichloropropane	-			ND (0.53)	ND (0.52)	ND (0.49)	ND (0.54)	ND (0.50)	ND (0.45)	ND (0.50)	ND (0.54)	ND (0.50)	ND (0.54)	ND (0.47)	ND (29)	ND (33)	ND (38)	ND (0.48)	ND (0.50)	ND (0.51)	ND (35)	ND (0.48)	ND (0.44)	ND (0.51)
cis-1,3-Dichloropropene	-	-	-	ND (0.53)	ND (0.52)	ND (0.49)	ND (0.54)	ND (0.50)	ND (0.45)	ND (0.51)	ND (0.54)	ND (0.50)	ND (0.54)	ND (0.48)	ND (29)	ND (33)	ND (39)	ND (0.48)	ND (0.50)	ND (0.51)	ND (36)	ND (0.48)	ND (0.44)	ND (0.51)
trans-1,3-Dichloropropene	-	-	-	ND (0.51)	ND (0.50)	ND (0.47)	ND (0.52)	ND (0.48)	ND (0.44)	ND (0.49)	ND (0.52)	ND (0.48)	ND (0.52)	ND (0.46)	ND (28)	ND (32)	ND (37)	ND (0.46)	ND (0.48)	ND (0.49)	ND (34)	ND (0.46)	ND (0.42)	ND (0.50)
Ethylbenzene	1000	41000	390000	ND (0.62)	ND (0.61)	ND (0.57)	ND (0.62)	ND (0.58)	ND (0.53)	ND (0.59)	ND (0.63)	ND (0.58)	ND (0.63)	ND (0.55)	547	506	**1120**	ND (0.56)	ND (0.58)	ND (0.59)	**1370**	ND (0.55)	ND (0.51)	1.4
Freon 113	-			ND (1.1)	ND (1.1)	ND (1.0)	ND (1.1)	ND (1.1)	ND (0.97)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.0)	ND (61)	ND (71)	ND (82)	ND (1.0)	ND (1.1)	ND (1.1)	ND (76)	ND (1.0)	ND (0.94)	ND (1.1)
2-Hexanone	-	-	-	ND (2.4)	ND (2.3)	ND (2.2)	ND (2.4)	ND (2.2)	ND (2.0)	ND (2.3)	ND (2.4)	ND (2.2)	ND (2.4)	ND (2.1)	ND (130)	ND (150)	ND (170)	ND (2.1)	ND (2.2)	ND (2.3)	ND (160)	ND (2.1)	ND (2.0)	ND (2.3)
Isopropylbenzene	-			ND (0.78)	ND (0.76)	ND (0.72)	ND (0.79)	ND (0.73)	ND (0.67)	ND (0.74)	ND (0.79)	ND (0.74)	ND (0.80)	ND (0.70)	985	262	331	ND (0.71)	0.89 J	ND (0.75)	146 J	ND (0.70)	1.0 J	ND (0.76)
p-Isopropyltoluene	-			ND (0.44)	ND (0.43)	ND (0.41)	ND (0.45)	ND (0.42)	ND (0.38)	ND (0.42)	ND (0.45)	ND (0.42)	ND (0.45)	ND (0.40)	27.7 J	ND (28)	ND (32)	ND (0.40)	ND (0.42)	ND (0.42)	ND (30)	ND (0.40)	ND (0.37)	ND (0.43)
Methyl Acetate	-	-	-	ND (1.6)	ND (1.5)	ND (1.4)	ND (1.6)	ND (1.5)	ND (1.3)	ND (1.5)	ND (1.6)	ND (1.5)	ND (1.6)	ND (1.4)	ND (84)	ND (98)	ND (110)	ND (1.4)	ND (1.5)	ND (1.5)	ND (100)	ND (1.4)	ND (1.3)	ND (1.5)
Methylcyclohexane	-	-	-	ND (0.98)	ND (0.96)	ND (0.90)	ND (0.99)	ND (0.92)	ND (0.84)	ND (0.93)	ND (0.99)	ND (0.92)	ND (1.0)	ND (0.88)	ND (53)	ND (61)	ND (71)	ND (0.89)	ND (0.93)	ND (0.94)	ND (65)	ND (0.88)	ND (0.81)	ND (0.95)
Methyl Tert Butyl Ether	930	100000	500000	ND (0.52)	ND (0.51)	ND (0.48)	ND (0.53)	ND (0.49)	ND (0.45)	ND (0.50)	ND (0.53)	ND (0.49)	ND (0.54)	ND (0.47)	ND (28)	ND (33)	ND (38)	ND (0.48)	ND (0.50)	ND (0.50)	ND (35)	ND (0.47)	ND (0.44)	ND (0.51)
4-Methyl-2-pentanone(MIBK)	-			ND (2.5)	ND (2.5)	ND (2.3)	ND (2.6)	ND (2.4)	ND (2.2)	ND (2.4)	ND (2.6)	ND (2.4) [a]	ND (2.6) [a]	ND (2.3) [a]	ND (140)	ND (160)	ND (180)	ND (2.3) [a]	ND (2.4) [a]	ND (2.4) [a]	ND (170)	ND (2.3) a	ND (2.1) a	ND (2.5) a
Methylene chloride	50	100000	500000	ND (2.8)	ND (2.7)	ND (2.6)	ND (2.8)	ND (2.6)	ND (2.4)	ND (2.7)	ND (2.8)	ND (2.6)	ND (2.9)	ND (2.5)	ND (150)	ND (180)	ND (200)	ND (2.5)	ND (2.6)	ND (2.7)	ND (190)	ND (2.5)	ND (2.3)	ND (2.7)
Naphthalene	12000	100000	500000	ND (2.8)	ND (2.7)	ND (2.6)	ND (2.8)	ND (2.6)	ND (2.4)	ND (2.7)	ND (2.8)	ND (2.6)	ND (2.9)	ND (2.5)	ND (150)	ND (180)	ND (200)	ND (2.5)	ND (2.6)	ND (2.7)	ND (190)	ND (2.5)	ND (2.3)	ND (2.7)
n-Propylbenzene	3900	100000	500000	ND (0.52)	ND (0.52)	ND (0.49)	ND (0.53)	ND (0.50)	ND (0.45)	ND (0.50)	ND (0.53)	ND (0.50)	ND (0.54)	0.52 J	1930	588	513	ND (0.48)	ND (0.50)	ND (0.50)	238	ND (0.47)	ND (0.44)	ND (0.51)
Styrene	-			ND (0.64)	ND (0.63)	ND (0.59)	ND (0.65)	ND (0.61)	ND (0.55)	ND (0.61)	ND (0.65)	ND (0.61)	ND (0.66)	ND (0.58)	ND (35)	ND (40)	ND (47)	ND (0.58)	ND (0.61)	ND (0.62)	ND (43)	ND (0.58)	ND (0.53)	ND (0.62)
1,1,2,2-Tetrachloroethane	-			ND (0.67)	ND (0.66)	ND (0.62)	ND (0.68)	ND (0.63)	ND (0.57)	ND (0.64)	ND (0.68)	ND (0.63)	ND (0.69)	ND (0.60)	ND (36)	ND (42)	ND (49)	ND (0.61)	ND (0.63)	ND (0.64)	ND (45)	ND (0.60)	ND (0.56)	ND (0.65)
Tetrachloroethene	1300	19000	150000	3.4	23.1	42.5	ND (0.66)	**2250**	29.2	ND (0.62)	ND (0.66)	ND (0.61)	3.4	21	ND (35)	ND (41)	ND (47)	1.1 J	165	ND (0.62)	ND (43)	ND (0.58)	**7330**	215
Toluene	700	100000	500000	ND (0.59)	ND (0.58)	ND (0.54)	ND (0.59)	ND (0.55)	ND (0.50)	ND (0.56)	ND (0.60)	ND (0.55)	ND (0.60)	ND (0.53)	63.7	399	ND (43)	ND (0.53)	ND (0.56)	ND (0.56)	ND (39)	ND (0.53)	ND (0.49)	ND (0.57)
1,2,3-Trichlorobenzene	-			ND (2.8)	ND (2.7)	ND (2.6)	ND (2.8)	ND (2.6)	ND (2.4)	ND (2.7)	ND (2.8)	ND (2.6)	ND (2.9)	ND (2.5)	ND (150)	ND (180)	ND (200)	ND (2.5)	ND (2.6)	ND (2.7)	ND (190)	ND (2.5)	ND (2.3)	ND (2.7)
1,2,4-Trichlorobenzene	-			ND (2.8)	ND (2.7)	ND (2.6)	ND (2.8)	ND (2.6)	ND (2.4)	ND (2.7)	ND (2.8)	ND (2.6)	ND (2.9)	ND (2.5)	ND (150)	ND (180)	ND (200)	ND (2.5)	ND (2.6)	ND (2.7)	ND (190)	ND (2.5)	ND (2.3)	ND (2.7)
1,1,1-Trichloroethane	680	100000	500000	ND (0.54)	ND (0.53)	ND (0.50)	ND (0.55)	ND (0.51)	ND (0.46)	ND (0.51)	ND (0.55)	ND (0.51)	ND (0.55)	ND (0.48)	ND (29)	ND (34)	ND (39)	ND (0.49)	ND (0.51)	ND (0.52)	ND (36)	ND (0.49)	ND (0.45)	ND (0.52)
1,1,2-Trichloroethane	-	-	-	ND (0.62)	ND (0.61)	ND (0.57)	ND (0.63)	ND (0.58)	ND (0.53)	ND (0.59)	ND (0.63)	ND (0.58)	ND (0.63)	ND (0.55)	ND (34)	ND (39)	ND (45)	ND (0.56)	ND (0.59)	ND (0.59)	ND (41)	ND (0.56)	ND (0.51)	ND (0.60)
Trichloroethene	470	21000	200000	ND (0.85)	62	140	ND (0.86)	57.2	9.4	ND (0.81)	ND (0.87)	ND (0.80)	8.3	9.1	ND (46)	ND (53)	ND (62)	ND (0.77)	39.4	ND (0.82)	ND (57)	ND (0.77)	147	53.6
Trichlorofluoromethane	-	-	-	ND (0.76)	ND (0.75)	ND (0.71)	ND (0.77)	ND (0.72)	ND (0.65)	ND (0.73)	ND (0.78)	ND (0.72)	ND (0.78)	ND (0.69)	ND (41)	ND (48)	ND (56)	ND (0.69)	ND (0.72)	ND (0.73)	ND (51)	ND (0.69)	ND (0.64)	ND (0.74)
1,2,4-Trimethylbenzene	3600	52000	190000	ND (0.71)	ND (0.70)	ND (0.66)	ND (0.72)	ND (0.67)	ND (0.61)	ND (0.68)	ND (0.72)	ND (0.67)	ND (0.73)	2.1	2670	1590	1880	ND (0.64)	0.83 J	ND (0.68)	918	ND (0.64)	ND (0.59)	0.89 J
1,3,5-Trimethylbenzene	8400	52000	190000	ND (0.48)	ND (0.47)	ND (0.44)	ND (0.49)	ND (0.45)	ND (0.41)	ND (0.46)	ND (0.49)	ND (0.45)	ND (0.49)	0.68 J	546	499	632	ND (0.44)	ND (0.46)	ND (0.46)	297	ND (0.43)	ND (0.40)	ND (0.47)
Vinyl chloride	20	900	13000	ND (0.54)	3.9	4.8	ND (0.54)	1.1 J	10.4	ND (0.51)	ND (0.55)	ND (0.51)	ND (0.55)	ND (0.48)	ND (29)	ND (34)	ND (39)	ND (0.49)	ND (0.51)	ND (0.52)	ND (36)	ND (0.48)	ND (0.45)	0.86 J
m,p-Xylene	260	100000	500000	ND (1.0)	ND (0.98)	ND (0.92)	ND (1.0)	ND (0.94)	ND (0.86)	ND (0.95)	ND (1.0)	ND (0.95)	ND (1.0)	0.91 J	**1050**	**2010**	**5100**	ND (0.91)	ND (0.95)	ND (0.96)	**5090**	ND (0.90)	ND (0.83)	4.6
o-Xylene	260	100000	500000	ND (0.65)	ND (0.64)	ND (0.60)	ND (0.66)	ND (0.61)	ND (0.56)	ND (0.62)	ND (0.66)	ND (0.62)	ND (0.67)	ND (0.58)	186	**699**	**1960**	ND (0.59)	ND (0.62)	ND (0.62)	135	ND (0.59)	ND (0.54)	ND (0.63)
Xylene (total)	260	100000	500000	ND (0.65)	ND (0.64)	ND (0.60)	ND (0.66)	ND (0.61)	ND (0.56)	ND (0.62)	ND (0.66)	ND (0.62)	ND (0.67)	0.91 J	**1240**	**2710**	**7060**	ND (0.59)	ND (0.62)	ND (0.62)	**5230**	ND (0.59)	ND (0.54)	4.6
Solids, Percent	%	%	%	78.6	77.3	82.1	77.5	79.1	84.4	81	75.9	80.3	74	83.2	81.7	72.2	73.3	79.6	76.2	81.9	75.2	79	79.1	78.2

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in h
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control lim

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Semi-Volatile Organic Compounds in Soil

Client Sample ID: Lab Sample ID: Date Sampled: Matrix:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	HA-1 (1-2') JD1592-1 1/13/2020 Soil	HA-2 (1-2') JD1592-2 1/13/2020 Soil	HA-3 (1-2') JD1592-3 1/13/2020 Soil	HA-4 (1-2') JD1592-4 1/13/2020 Soil	HA-5(4-4.5) JD1645-1 1/14/2020 Soil	HA-6 (1-2') JD1645-2 1/14/2020 Soil	HA-7 (1-2') JD1645-3 1/14/2020 Soil	HA-8 (1-2') JD1645-4 1/14/2020 Soil	HA-9 (1-2') JD1645-5 1/14/2020 Soil	HA-10 (1-2) JD1731-1 1/15/2020 Soil	HA-11 (4-4.5') JD1731-2 1/15/2020 Soil	HA-12 (1-2) JD1731-3 1/15/2020 Soil	HA-13 (1-2) JD1731-4 1/15/2020 Soil	HA-14 (1-2) JD1731-5 1/15/2020 Soil
MS Semi-Volatiles (SW846 8270D - values reported in ug/kg																	
2-Chlorophenol	-			ND (18)	ND (20)	ND (17)	ND (18)	ND (19)	ND (18)	ND (18)	ND (18)	ND (18)	ND (17)	ND (18)	ND (17)	ND (16)	ND (17)
4-Chloro-3-methyl phenol	-	-	-	ND (22) [a]	ND (25) [a]	ND (22) [a]	ND (22) [a]	ND (24)	ND (22)	ND (23)	ND (22)	ND (22)	ND (21)	ND (22)	ND (21)	ND (20)	ND (21)
2,4-Dichlorophenol	-			ND (31)	ND (35)	ND (30)	ND (31)	ND (33)	ND (31)	ND (31)	ND (31)	ND (30)	ND (30)	ND (30)	ND (29)	ND (28)	ND (29)
2,4-Dimethylphenol	-	-	-	ND (64) [a]	ND (73) [a]	ND (63) [a]	ND (65) [a]	ND (69) [a]	ND (64) [a]	ND (65) [a]	ND (65) [a]	ND (63) [a]	ND (62) [a]	ND (64) [a]	ND (62) [a]	ND (58) [a]	ND (60) [a]
2,4-Dinitrophenol	-			ND (140)	ND (150)	ND (130)	ND (140)	ND (150)	ND (140)	ND (140)	ND (140)	ND (130)	ND (130)	ND (130)	ND (130)	ND (120)	ND (130)
4,6-Dinitro-o-cresol	-	-	-	ND (39)	ND (44)	ND (38)	ND (39)	ND (41)	ND (38)	ND (39)	ND (39)	ND (38)	ND (37)	ND (38)	ND (37)	ND (35)	ND (36)
2-Methylphenol	330	100000	500000	ND (23)	ND (26)	ND (22)	ND (23)	ND (25)	ND (23)	ND (24)	ND (23)	ND (23)	ND (22)	ND (23)	ND (22)	ND (21)	ND (22)
3&4-Methylphenol	-	-	-	ND (30)	ND (34)	ND (29) [a]	ND (30) [a]	ND (32)	ND (30)	ND (30)	ND (30)	ND (29)	ND (28)	ND (29)	ND (28)	ND (27)	ND (28)
2-Nitrophenol	-			ND (24)	ND (27)	ND (23)	ND (24)	ND (25)	ND (24)	ND (24)	ND (24)	ND (23)	ND (23)	ND (24)	ND (23)	ND (22)	ND (22)
4-Nitrophenol	-			ND (96)	ND (110)	ND (94)	ND (97)	ND (100)	ND (96)	ND (98)	ND (97)	ND (95)	ND (92) [a]	ND (95)	ND (92)	ND (88) [a]	ND (91) [a]
Pentachlorophenol	800	6700	6700	ND (34)	ND (39)	ND (33)	ND (34)	ND (36)	ND (34)	ND (35)	ND (34)	ND (33)	ND (32)	ND (34)	ND (32)	ND (31)	ND (32)
Phenol	330	100000	500000	ND (19)	ND (21)	ND (18)	ND (19)	ND (20)	ND (19)	ND (19)	ND (19)	ND (19)	ND (18)	ND (19)	ND (18)	ND (17)	ND (18)
2,3,4,6-Tetrachlorophenol	-	-	-	ND (24)	ND (27)	ND (23)	ND (24)	ND (26)	ND (24)	ND (24)	ND (24)	ND (23)	ND (23) [a]	ND (24)	ND (23)	ND (22) [a]	ND (22) [a]
2,4,5-Trichlorophenol	-			ND (27)	ND (31)	ND (26)	ND (27)	ND (29)	ND (27)	ND (28)	ND (27)	ND (27)	ND (26)	ND (27)	ND (26)	ND (25)	ND (25)
2,4,6-Trichlorophenol	-			ND (21)	ND (25)	ND (21)	ND (22)	ND (23)	ND (21)	ND (22)	ND (22)	ND (21)	ND (21)	ND (21)	ND (21)	ND (20)	ND (20)
Acenaphthene	20000	100000	500000	ND (12)	ND (14)	ND (12)	ND (13)	ND (13)	ND (12)	ND (13)	ND (13)	15.9 J	ND (12)	ND (12)	ND (12)	ND (11)	ND (12)
Acenaphthylene	100000	100000	500000	ND (18)	ND (21)	ND (18)	ND (18)	ND (20)	ND (18)	ND (19)	ND (19)	40.7	ND (18)	ND (18)	ND (18)	ND (17)	ND (17)
Acetophenone	-	-	-	ND (7.7)	ND (8.8)	ND (7.6)	ND (7.8)	ND (8.3)	ND (7.7)	ND (7.9)	ND (7.8)	ND (7.6)	ND (7.4)	ND (7.7)	ND (7.4)	ND (7.1)	ND (7.3)
Anthracene	100000	100000	500000	ND (22)	ND (25)	ND (22)	ND (22)	ND (24)	ND (22)	ND (23)	ND (22)	135	ND (21)	ND (22)	ND (21)	ND (20)	ND (21)
Atrazine	-	-	-	ND (15)	ND (18)	ND (15)	ND (16)	ND (17)	ND (15)	ND (16)	ND (16)	ND (15)	ND (15)	ND (15)	ND (15)	ND (14)	ND (15)
Benzo(a)anthracene	1000	1000	5600	24.1 J	16.1 J	36.6	10.3 J	ND (11)	11.9 J	17.9 J	ND (10)	**1070**	ND (9.8)	ND (10)	ND (9.8)	25.2 J	ND (9.6)
Benzo(a)pyrene	1000	1000	1000	33.3 J	ND (19)	36.5	ND (17)	ND (18)	ND (16)	18.8 J	ND (17)	813	ND (16)	ND (16)	ND (16)	24.1 J	ND (15)
Benzo(b)fluoranthene	1000	1000	5600	38	19.5 J	47.7	ND (16)	ND (17)	ND (16)	26.2 J	ND (16)	**1060**	ND (15)	ND (16)	ND (15)	29.1 J	ND (15)
Benzo(g,h,i)perylene	100000	100000	500000	26.2 J	ND (21)	27.5 J	ND (18)	ND (19)	ND (18)	ND (18)	ND (18)	433	ND (17)	ND (18)	ND (17)	ND (16)	ND (17)
Benzo(k)fluoranthene	800	3900	56000	ND (17)	ND (19)	24.1 J	ND (17)	ND (18)	ND (17)	ND (17)	ND (17)	370	ND (16)	ND (17)	ND (16)	ND (15)	ND (16)
4-Bromophenyl phenyl ether	-	-	-	ND (14)	ND (16)	ND (14)	ND (14)	ND (15)	ND (14)	ND (14)	ND (14)	ND (14)	ND (13)	ND (14)	ND (13)	ND (13)	ND (13)
Butyl benzyl phthalate	-			ND (8.8)	ND (10) [a]	ND (8.6)	ND (8.9)	ND (9.4)	ND (8.8)	ND (9.0)	ND (8.9)	ND (8.7)	ND (8.4)	ND (8.7)	ND (8.4)	ND (8.0)	ND (8.3)
1,1'-Biphenyl	-			ND (4.9)	ND (5.6)	ND (4.8)	ND (5.0)	ND (5.3)	ND (4.9)	ND (5.0)	ND (5.0)	5.0 J	ND (4.7)	ND (4.9)	ND (4.7)	ND (4.5)	ND (4.7)
Benzaldehyde	-	-	-	ND (8.9)	ND (10)	ND (8.7)	ND (9.0)	ND (9.6)	ND (8.9)	ND (9.1)	ND (9.0)	ND (8.8)	ND (8.6)	ND (8.9)	ND (8.6)	ND (8.1)	ND (8.4)
2-Chloronaphthalene	-	-	-	ND (8.6)	ND (9.8)	ND (8.4)	ND (8.7)	ND (9.2)	ND (8.6)	ND (8.8)	ND (8.7)	ND (8.4)	ND (8.2)	ND (8.5)	ND (8.2)	ND (7.8)	ND (8.1)
4-Chloroaniline	-			ND (13)	ND (15)	ND (13)	ND (13)	ND (14)	ND (13)	ND (13)	ND (13)	ND (13)	ND (12)	ND (13)	ND (12)	ND (12)	ND (12)
Carbazole	-	-	-	ND (5.2)	ND (6.0)	ND (5.1)	ND (5.3)	ND (5.6)	ND (5.2)	ND (5.3)	ND (5.3)	17.4 J	ND (5.0)	ND (5.2)	ND (5.0)	ND (4.8)	ND (4.9)
Caprolactam	-	-	-	ND (14)	ND (16)	ND (14)	ND (14)	ND (15)	ND (14)	ND (15)	ND (14)	ND (14)	ND (14)	ND (14)	ND (14)	ND (13)	ND (13)
Chrysene	1000	3900	56000	20.9 J	ND (13)	37.5	ND (11)	ND (12)	ND (11)	13.3 J	ND (11)	950	ND (11)	ND (11)	ND (11)	20.9 J	ND (11)
bis(2-Chloroethoxy)methane	-	-	-	ND (7.7)	ND (8.8)	ND (7.5)	ND (7.8)	ND (8.3)	ND (7.7)	ND (7.9)	ND (7.8)	ND (7.6)	ND (7.4)	ND (7.6)	ND (7.4)	ND (7.0)	ND (7.3)
bis(2-Chloroethyl)ether	-	-	-	ND (16)	ND (18)	ND (15)	ND (16)	ND (17)	ND (15)	ND (16)	ND (16)	ND (15)	ND (15)	ND (15)	ND (15)	ND (14)	ND (15)
2,2'-Oxybis(1-chloropropane)	-	-	-	ND (13)	ND (15)	ND (13)	ND (13)	ND (14)	ND (13)	ND (13)	ND (13)	ND (13)	ND (12)	ND (13)	ND (12)	ND (12)	ND (12)
4-Chlorophenyl phenyl ether	-	-	-	ND (12)	ND (13)	ND (11)	ND (12)	ND (12)	ND (12)	ND (12)	ND (12)	ND (11)	ND (11)	ND (12)	ND (11)	ND (11)	ND (11)
2,4-Dinitrotoluene	-	-	-	ND (11) [a]	ND (13) [a]	ND (11)	ND (11)	ND (12)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (10)	ND (11)
2,6-Dinitrotoluene	-			ND (18)	ND (21)	ND (18)	ND (18)	ND (19)	ND (18)	ND (18)	ND (18)	ND (18)	ND (17)	ND (18)	ND (17)	ND (16)	ND (17)
3,3'-Dichlorobenzidine	-	-	-	ND (30) [a]	ND (34) [a]	ND (29)	ND (30)	ND (32)	ND (30)	ND (31)	ND (30)	ND (30)	ND (29)	ND (30)	ND (29)	ND (27)	ND (28)
1,4-Dioxane	100	13000	130000	ND (24)	ND (27)	ND (23)	ND (24)	ND (25)	ND (24)	ND (24)	ND (24)	ND (23)	ND (23)	ND (24)	ND (23)	ND (22)	ND (22)
Dibenzo(a,h)anthracene	330	330	560	ND (16) [a]	ND (18) [a]	ND (16)	ND (16)	ND (17)	ND (16)	ND (16)	ND (16)	140	ND (15)	ND (16)	ND (15)	ND (15)	ND (15)
Dibenzofuran	7000	59000	350000	ND (15)	ND (17)	ND (14)	ND (15)	ND (16)	ND (15)	ND (15)	ND (15)	ND (14)	ND (14)	ND (15)	ND (14)	ND (13)	ND (14)
Di-n-butyl phthalate	-			ND (5.9)	ND (6.7)	ND (5.7)	ND (5.9)	ND (6.3)	ND (5.9)	ND (6.0)	ND (5.9)	ND (5.8)	ND (5.6)	ND (5.8)	ND (5.6)	ND (5.4)	ND (5.5)
Di-n-octyl phthalate	-			ND (9.0)	ND (10)	ND (8.8)	ND (9.1)	ND (9.6)	ND (9.0)	ND (9.2)	ND (9.1)	ND (8.8)	ND (8.6)	ND (8.9)	ND (8.6)	ND (8.2)	ND (8.5)
Diethyl phthalate	-			ND (7.7)	ND (8.8)	ND (7.5)	ND (7.7)	ND (8.2)	ND (7.7)	ND (7.8)	ND (7.8)	ND (7.6)	ND (7.4)	ND (7.6)	ND (7.4)	ND (7.0)	ND (7.2)
Dimethyl phthalate	-			ND (6.4)	ND (7.3)	ND (6.3)	ND (6.5)	ND (6.9)	ND (6.4)	ND (6.5)	ND (6.5)	ND (6.3)	ND (6.2)	ND (6.4)	ND (6.2)	ND (5.8)	ND (6.0)
bis(2-Ethylhexyl)phthalate	-			46.7 J	ND (9.6)	ND (8.2) [a]	ND (8.5) [a]	ND (9.0)	ND (8.4)	58.9 J	ND (8.5)	ND (8.3)	ND (8.1)	ND (8.4)	ND (8.1)	ND (7.7)	ND (7.9)
Fluoranthene	100000	100000	500000	40	21.6 J	55.7	ND (16)	ND (17)	ND (16)	24.5 J	ND (16)	1580	ND (15)	ND (16)	ND (15)	29.8 J	ND (15)
Fluorene	30000	100000	500000	ND (17)	ND (19)	ND (16)	ND (17)	ND (18)	ND (17)	ND (17)	ND (17)	ND (16)	ND (16)	ND (16)	ND (16)	ND (15)	ND (16)
Hexachlorobenzene	330	1200	6000	ND (9.1)	ND (10)	ND (8.9)	ND (9.2)	ND (9.8)	ND (9.1)	ND (9.3)	ND (9.2)	ND (9.0)	ND (8.8)	ND (9.0)	ND (8.7)	ND (8.3)	ND (8.6)
Hexachlorobutadiene	-	-	-	ND (14)	ND (17)	ND (14)	ND (15)	ND (16)	ND (14)	ND (15)	ND (15)	ND (14)	ND (14)	ND (14)	ND (14)	ND (13)	ND (14)
Hexachlorocyclopentadiene	-			ND (14)	ND (16)	ND (14)	ND (14)	ND (15)	ND (14)	ND (15)	ND (14)	ND (14)	ND (14)	ND (14)	ND (14)	ND (13)	ND (14)
Hexachloroethane	-	-	-	ND (18)	ND (20)	ND (17)	ND (18)	ND (19)	ND (18)	ND (18)	ND (18)	ND (18)	ND (17)	ND (18)	ND (17)	ND (16)	ND (17)
Indeno(1,2,3-cd)pyrene	500	500	5600	25.4 J	ND (19)	25.5 J [b]	ND (17) [a]	ND (18)	ND (17)	ND (17)	ND (17)	**534**	ND (16) [a]	ND (17)	ND (16)	15.7 J [b]	ND (16) [a]
Isophorone	-			ND (7.7)	ND (8.8)	ND (7.5)	ND (7.8)	ND (8.3)	ND (7.7)	ND (7.9)	ND (7.8)	ND (7.6)	ND (7.4)	ND (7.6)	ND (7.4)	ND (7.0)	ND (7.3)
2-Methylnaphthalene	-			ND (8.1)	ND (9.3)	ND (7.9)	ND (8.2)	ND (8.7)	ND (8.1)	ND (8.3)	ND (8.2)	ND (8.0)	ND (7.8)	ND (8.1)	ND (7.8)	ND (7.4)	ND (7.7)
2-Nitroaniline	-			ND (8.5)	ND (9.7)	ND (8.3)	ND (8.6)	ND (9.1)	ND (8.5)	ND (8.7)	ND (8.6)	ND (8.4)	ND (8.2)	ND (8.4)	ND (8.2)	ND (7.8)	ND (8.0)
3-Nitroaniline	-			ND (9.0) [a]	ND (10) [a]	ND (8.8)	ND (9.1)	ND (9.6)	ND (9.0)	ND (9.2)	ND (9.1)	ND (8.9)	ND (8.7)	ND (8.9)	ND (8.6)	ND (8.2)	ND (8.5)
4-Nitroaniline	-	-	-	ND (9.3)	ND (11)	ND (9.1)	ND (9.4)	ND (10)	ND (9.3)	ND (9.5)	ND (9.4)	ND (9.2)	ND (9.0)	ND (9.3)	ND (9.0)	ND (8.5)	ND (8.8)
Naphthalene	12000	100000	500000	ND (10)	ND (12)	ND (9.9)	ND (10)	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	ND (9.8)	ND (10)	ND (9.7)	ND (9.3)	ND (9.6)
Nitrobenzene	-	15000	69000	ND (14)	ND (16)	ND (14)	ND (14)	ND (15)	ND (14)	ND (14)	ND (14)	ND (14)	ND (13)	ND (14)	ND (13)	ND (13)	ND (13)
N-Nitroso-di-n-propylamine	-	-	-	ND (10)	ND (12)	ND (10)	ND (11)	ND (11)	ND (10)	ND (11)	ND (11)	ND (10)	ND (10)	ND (10)	ND (10)	ND (9.5)	ND (9.8)
N-Nitrosodiphenylamine	-			ND (13)	ND (15)	ND (13)	ND (13)	ND (14)	ND (13)	ND (13)	ND (13)	ND (13)	ND (13)	ND (13)	ND (13)	ND (12)	ND (12)
Phenanthrene	100000	100000	500000	15.5 J	ND (14)	14.3 J	ND (12)	ND (13)	ND (12)	12.3 J	ND (12)	243	ND (12)	ND (12)	ND (12)	16.9 J	ND (11)
Pyrene	100000	100000	500000	36.4	20.2 J	52.3	ND (12)	ND (12)	ND (12)	20.3 J	ND (12)	1520	ND (11)	ND (11)	ND (11)	27.1 J	ND (11)
1,2,4,5-Tetrachlorobenzene	-	-	-	ND (9.2)	ND (10)	ND (8.9)	ND (9.2)	ND (9.8)	ND (9.1)	ND (9.3)	ND (9.3)	ND (9.0)	ND (8.8)	ND (9.1)	ND (8.8)	ND (8.3)	ND (8.6)

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Metals in Soils

Client Sample ID:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NYSCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6	NYSCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	HA-1 (1-2')	HA-2 (1-2')	HA-3 (1-2')	HA-4 (1-2')	HA-5(4-4.5)	HA-6 (1-2')	HA-7 (1-2')	HA-8 (1-2')	HA-9 (1-2')	HA-10 (1-2)	HA-11 (4-4.5')	HA-12 (1-2)	HA-13 (1-2)	HA-14 (1-2)
Lab Sample ID:				JD1592-1	JD1592-2	JD1592-3	JD1592-4	JD1645-1	JD1645-2	JD1645-3	JD1645-4	JD1645-5	JD1731-1	JD1731-2	JD1731-3	JD1731-4	JD1731-5
Date Sampled:				1/13/2020	1/13/2020	1/13/2020	1/13/2020	1/14/2020	1/14/2020	1/14/2020	1/14/2020	1/14/2020	1/15/2020	1/15/2020	1/15/2020	1/15/2020	1/15/2020
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis - values reported in mg/kg																	
Aluminum	-			5940	8110	5030	5770	3600	4850	7940	7140	3200	1060	1480	1750	1880	1530
Antimony	-			<2.3	<2.4	<2.2	<2.3	<2.4	<2.2	<2.4	<2.2	<2.2	<2.0	<2.1	<2.1	<2.1	<2.2
Arsenic	13	16	16	3	5.5	3.1	2.9	3.2	2.9	5.7	3.2	4.1	<2.0	2.4	<2.1	2.3	<2.2
Barium	350	400	400	35.2	35.5	<22	<23	<24	<22	<24	<22	77.7	<20	<21	<21	<21	<22
Beryllium	7.2	72	590	<0.23	0.38	0.22	0.25	<0.24	0.24	0.42	0.36	<0.22	<0.20	<0.21	<0.21	<0.21	<0.22
Cadmium	2.5	4.3	9.3	<0.58	<0.61	<0.55	<0.57	<0.59	<0.54	<0.59	<0.56	0.65	<0.50	<0.52	<0.52	<0.52	<0.54
Calcium	-			8360	2420	1410	783	<590	591	1070	<560	2470	<500	<520	<520	<520	<540
Chromium	-	-	-	12.6	14.4	13.1	8.2	6.5	8.4	10	8.1	7.9	2.6	3.2	2.4	3.7	3.2
Cobalt	-			<5.8	<6.1	<5.5	<5.7	<5.9	<5.4	<5.9	<5.6	<5.4	<5.0	<5.2	<5.2	<5.2	<5.4
Copper	50	270	270	10.1	13.1	10.1	5.9	4.3	6.3	18.9	4.8	11.2	<2.5	<2.6	<2.6	3.8	2.7
Iron	-			7350	10900	9370	5950	6200	7030	8700	8270	5010	1610	1970	1870	2770	2200
Lead	63	400	1000	18.9	28.3	11.8	13.6	2.5	12.2	42.5	8.3	**112**	2.6	<2.1	<2.1	16.9	5.4
Magnesium	-	-	-	1550	1630	1630	654	<590	728	824	570	1140	<500	<520	<520	<520	<540
Manganese	1600	2000	10000	79.3	135	99.6	134	82.8	80.9	189	115	71.8	21.7	9	11	24.1	21.1
Mercury	0.18	0.81	2.8	0.054	0.06	<0.033	<0.035	<0.032	<0.035	0.16	<0.032	0.034	<0.034	<0.036	<0.032	<0.034	<0.030
Nickel	30	310	310	6.6	8.5	7.6	5.4	5.9	5.2	8.3	5.4	5.4	<4.0	<4.2	<4.2	<4.2	<4.3
Potassium	-	-	-	<1200	<1200	<1100	<1100	<1200	<1100	<1200	<1100	<1100	<1000	<1000	<1000	<1000	<1100
Selenium	3.9	180	1500	<2.3	<2.4	<2.2	<2.3	<2.4	<2.2	<2.4	<2.2	<2.2	<2.0	<2.1	<2.1	<2.1	<2.2
Silver	2	180	1500	<0.58	<0.61	<0.55	<0.57	<0.59	<0.54	<0.59	<0.56	<0.54	<0.50	<0.52	<0.52	<0.52	<0.54
Sodium	-	-	-	<1200	<1200	<1100	<1100	<1200	<1100	<1200	<1100	<1100	<1000	<1000	<1000	<1000	<1100
Thallium	-			<1.2	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2	<1.1	<1.1	<1.0	<1.0	<1.0	<1.0	<1.1
Vanadium	-			15.6	23.3	18.5	10.7	9.3	12.1	15.8	12.9	10.1	<5.0	<5.2	<5.2	5.6	<5.4
Zinc	109	10000	10000	76.2	50.5	23.1	37.6	18.1	17.4	74	16.9	**134**	<5.0	<5.2	<5.2	15.5	9.4

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Metals in Soil

Client Sample ID:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-1 (4-5)	SB-1 (11-12)	SB-1 (25-26)	SB-1 (28.5-29.5)	SB-1 (34-35)	SB-2 (4-5)	SB-2 (7-8)	SB-2 (18-19)	SB-2 (29-30)	SB-2 (34-35)	SB-3 (5-6)	SB-3 (15-16)	SB-3 (34-35)	SB-4 (5-6)	SB-4 (7-8)	SB-4 (15-16)	SB-4 (30-31)	SB-4 (34-35)	SB-5 (6-7)	SB-5 (10-11)	SB-5 (18-19)	SB-5 (29-30)	SB-5 (34-35)	SB-5 (34-35) DUP
Lab Samole ID:				JD7490-1	JD7495-2	JD7490-5	JD7495-3	JD7490-6	JD7490-7	JD7490-8	JD7490-9	JD7490-11	JD7490-12	JD7623-4	JD7490-24	JD7623-5	JD7490-13	JD7490-14	JD7490-16	JD7490-17	JD7490-18	JD7642-14	JD7642-16	JD7642-17	JD7642-18	JD7642-19	JD7642-20
Date Samoled:				5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/22/2020	5/22/2020	5/22/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/29/2020	5/29/2020	5/29/2020	5/29/2020	5/29/2020	5/29/2020
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis - values reported in mg/kg																											
Aluminum	-			11400	19500	8700	5540	2820	5000	2070	5690	3060	2840	1450	11200	2450	1840	1180	5190	7950	8980	4040	15800	2520	2440	6530	5760
Antimony	-	-		<2.4	<5.4 [a]	<2.5	<2.5	<2.4	<2.2	<2.5	<2.4	<2.5	<2.6	<2.3	<2.3	<2.7	<2.3	<2.5	<2.5	<2.9	<2.5	<2.4	<2.7	<2.4	<2.7	<2.7	<2.6
Arsenic	13	16	16	4.4	12.9 [a]	8.3	8.1	2.5	3	<2.5	6.9	3.1	5	<2.3	**16.9**	5.5	2.7	2.5	2.8	6.9 [a]	**16.9 [a]**	6.4	**18.5 [a]**	<2.4	<2.7	7.9	7.3
Barium	350	400	400	29.3	35.2	<25	<25	<24	<22	<25	<24	<25	<26	<23	27.7	<27	<23	<25	<25	<29	33.2	<24	38.1	<24	<27	<27	<26
Beryllium	7.2	72	590	<0.24	<0.27	<0.25	0.3	<0.24	<0.22	<0.25	<0.24	0.41	0.29	<0.23	0.47	0.35	<0.23	<0.25	0.3	0.74	0.85	<0.24	0.74	<0.24	<0.27	0.32	0.51
Cadmium	2.5	4.3	9.3	<0.59	<1.4 [a]	<0.63	<0.62	<0.60	<0.56	<0.62	<0.61	<0.62	<0.64	<0.58	<0.58	<0.67	<0.57	<0.62	<0.62	<1.4 [a]	<1.3 [a]	<0.60	<1.3 [a]	<0.61	<0.67	<0.67	<0.65
Calcium	-			1050	758	<630	<620	<600	3650	<620	<610	<620	<640	<580	<580	<670	<570	<620	<620	5750	15600	<600	1740	<610	<670	<670	<650
Chromium	-	-	-	19.2	24.8	38.4	15.6	8.9	8.2	4.2	6.2	9.6	8.9	3.2	10	11.3	4.1	4.1	6.4	20	26.3	10.8	20.4	3.5	3.9	22	20
Cobalt	-			<5.9	<6.8	<6.3	9.3	<6.0	<5.6	<6.2	<6.1	7.6	<6.4	<5.8	7.5	<6.7	<5.7	<6.2	<6.2	<7.1	<6.3	<6.0	10.6	<6.1	<6.7	<6.7	<6.5
Copper	50	270	270	6.3	12.0 [a]	6.7	<3.1	<3.0	3.7	<3.1	<3.1	<3.1	<3.2	<2.9	5.1	<3.3	<2.9	<3.1	<3.1	<7.1 [a]	6.5 [a]	3	9.2 [a]	<3.1	<3.4	4.1	3.7
Iron	-	-	-	15500	30200 [a]	16800	10700	6110	6590	2910	10600	4860	13100	1940	15100	6490	2710	2300	9900	31000	28100	9840	36200	5630	3890	10800	10700
Lead	63	400	1000	6.6	11.4 [a]	5.2	4.3	<2.4	3.1	<2.5	3.6	<2.5	2.6	<2.3	7.7	2.7	<2.3	2.8	3.1	7.4 [a]	8.7 [a]	3	9.2 [a]	<2.4	<2.7	5.3	21.8
Magnesium	-	-	-	1380	4010	1560	1260	691	601	<620	890	<620	1050	<580	1690	<670	<570	<620	891	3770	4250	<600	3300	<610	<670	1250	1470
Manganese	1600	2000	10000	120	247 [a]	74	38.3	48.4	50.5	20.6	86.5	14.8	97.5	6.9	411	14.1	14.1	8.1	114	265 [a]	295 [a]	22.4	878 [a]	117	29.3	36.9	55.6
Mercury	0.18	0.81	2.8	<0.030	<0.034	<0.031	<0.034	<0.029	<0.035	<0.033	<0.034	<0.038	<0.032	<0.036	<0.087	<0.043	<0.032	<0.033	<0.030	<0.036	<0.039	<0.036	<0.032	<0.039	<0.033	<0.031	<0.029
Nickel	30	310	310	10.2	16.7	8.3	18.2	<4.8	5	<5.0	<4.9	15.2	<5.1	<4.6	9.4	<5.3	<4.6	<5.0	7.2	12.5	14.9	<4.8	15.1	<4.9	<5.4	6.7	10.4
Potassium	-	-	-	<1200	1700	1560	1760	<1200	<1100	<1200	<1200	1210	1310	<1200	<1200	<1300	<1100	<1200	<1200	2260	2970	<1200	1550	<1200	<1300	1600	1600
Selenium	3.9	180	1500	<2.4	<5.4 [a]	<2.5	<2.5	<2.4	<2.2	<2.5	<2.4	<2.5	<2.6	<2.3	<2.3	<2.7	<2.3	<2.5	<2.5	<5.7 [a]	<5.0 [a]	<2.4	<5.4 [a]	<2.4	<2.7	<2.7	<2.6
Silver	2	180	1500	<0.59	<1.4 [a]	<0.63	<0.62	<0.60	<0.56	<0.62	<0.61	<0.62	<0.64	<0.58	<0.58	<0.67	<0.57	<0.62	<0.62	<1.4 [a]	<1.3 [a]	<0.60	<1.3 [a]	<0.61	<0.67	<0.67	<0.65
Sodium	-	-	-	<1200	<1400	<1300	<1200	<1200	<1100	<1200	<1200	<1200	<1300	<1200	<1200	<1300	<1100	<1200	<1200	<1400	<1300	<1200	<1300	<1200	<1300	<1300	<1300
Thallium	-			<1.2	<2.7 [a]	<1.3	<1.2	<1.2	<1.1	<1.2	<1.2	<1.2	<1.3	<1.2	<1.2	<1.3	<1.1	<1.2	<1.2	<2.9 [a]	<2.5 [a]	<1.2	<2.7 [a]	<1.2	<1.3	<1.3	<1.3
Vanadium	-			23.6	39.8	22.2	23.4	7.3	11.8	<6.2	12.8	11.9	11	<5.8	36.5	12.5	5.9	<6.2	8.2	25.2	34.4	14.5	43.9	6.9	<6.7	21.4	20.8
Zinc	109	10000	10000	20.4	49.6	36.2	35	23.9	9.7	6.2	20.5	54	21.6	<5.8	31.3	11.5	9.9	7.7	26	44.7	47	30.4	44.6	11.9	7.7	33.8	33.5

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits hiah. samole was ND.
b This comsound in blank soike is outside in house QC limits bias hiah.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Metals in Soil

Client Sample ID:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-7 (5-6)	SB-7 (13-14)	SB-7 (21-22)	SB-7 (21-22) Dup	SB-7 (23-24)	SB-7 (34-35)	SB-8 (5-6)	SB-8 (10-11)	SB-8 (11.5-12.5)	SB-8 (18-19)	SB-8 (34-35)	SB-13 (5'-6")	SB-13 (10'-11")	SB-13 (13'-14")	SB-13 (21'-22")	SB-13 (28'-29")	SB-14 (6-7)	SB-14 (11-12)	SB-14 (22-23)	SB-14 (29-30)	SB-14 (34-35)
Lab Samole ID:				JD7623-6	JD7623-7	JD7623-9	JD7623-10	JD7623-11	JD7623-12	JD7490-19	JD7490-20	JD7490-21	JD7490-22	JD7490-23	JD7642-4	JD7642-5	JD7642-7	JD7642-9	JD7642-10	JD7623-18	JD7623-19	JD7623-21	JD7623-22	JD7623-23
Date Samoled:				5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/27/2020	5/27/2020	5/27/2020	5/27/2020	5/27/2020
Matrix:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Metals Analysis - values reported in mg/kg																								
Aluminum	-			10300	21900	3710	3630	11100	12900	891	8760	17800	6040	10500	9570	3930	19300	6020	11500	10700	12900	7970	11500	4150
Antimony	-			<2.5	<2.8	<2.5	<2.5	<2.6	<2.7	<2.5	<2.5	<2.7	<2.4	<2.6	<2.4	<2.9	<2.7	<2.4	<2.6	<2.4	<2.6	<2.6	<2.5	<2.6
Arsenic	13	16	16	7.9	11.7	4.4	4.5	<2.6	12.9	<2.5	8	11.5	4.4	<2.6	9.7	6.2	9.6	<2.4	**15.5**	9.6	10	<2.6	**15.1**	7.7
Barium	350	400	400	<25	76.9	<25	<25	<26	<27	<25	<25	41.3	<24	<26	<24	<29	45.8	<24	<26	25	<26	<26	<25	<26
Beryllium	7.2	72	590	<0.25	0.59	<0.25	<0.25	<0.26	<0.27	<0.25	0.27	0.62	0.33	0.45	0.26	<0.29	0.59	<0.24	0.5	0.29	<0.26	<0.26	<0.25	0.65
Cadmium	2.5	4.3	9.3	<0.62	<0.71	<0.62	<0.62	<0.65	<0.67	<0.61	<0.62	<0.68	<0.59	<0.64	<0.61	<0.71	<0.68	<0.60	<0.64	<0.60	<0.65	<0.65	<0.63	<0.65
Calcium	-			691	951	<620	<620	<650	<670	<610	1410	786	<590	<640	1350	<710	917	<600	<640	<600	745	<650	<630	<650
Chromium	-	-	-	17	29.9	4.2	4.5	10.7	47.4	4	21.6	22	8.6	20.9	18.4	14.2	25	6.2	46.2	18	25.3	8.3	30.3	12.6
Cobalt	-			<6.2	<7.1	<6.2	<6.2	<6.5	<6.7	<6.1	<6.2	<6.8	<5.9	<6.4	<6.1	<7.1	7.6	<6.0	<6.4	<6.0	<6.5	<6.5	14	<6.5
Copper	50	270	270	7.2	15.7	<3.1	<3.1	6.1	8.2	<3.1	7.9	11.5	3.5	6.4	7.7	3.7	13	4	7.2	8.8	8.3	4.4	7	<3.2
Iron	-			12500	26600	6160	6070	14600	19800	2230	12700	22300	10200	10200	20700	10900	22300	9080	19800	15600	23900	10200	19000	10400
Lead	63	400	1000	6.4	12.6	<2.5	<2.5	5.1	8.1	<2.5	6.1	10.6	4.2	5.4	6.1	3.2	11.2	2.8	7.5	6.8	8.3	3.3	8.3	3.4
Magnesium	-	-	-	1930	5160	<620	<620	2590	2570	<610	1810	4230	1280	2080	1840	<710	4890	1130	2430	2000	2730	1560	2240	1300
Manganese	1600	2000	10000	74.1	220	48.3	43.6	137	109	10.5	85.8	161	83.8	80.4	151	76.3	190	71.5	78.4	78.5	148	102	68.3	51.7
Mercury	0.18	0.81	2.8	<0.034	<0.040	<0.039	<0.038	<0.034	<0.030	<0.038	<0.037	<0.030	<0.034	<0.039	<0.030	<0.032	<0.035	<0.030	<0.033	<0.030	<0.043	<0.033	<0.040	<0.030
Nickel	30	310	310	7.7	20	<4.9	<5.0	9.9	9.6	<4.9	8.2	16.9	6.8	6.9	7.5	<5.7	19.9	<4.8	9.9	7.6	11.1	6.6	24.3	6.9
Potassium	-	-	-	<1200	2170	<1200	<1200	<1300	2610	<1200	<1200	1640	<1200	2260	<1200	<1400	1920	<1200	2700	<1200	<1300	<1300	2620	1750
Selenium	3.9	180	1500	<2.5	<2.8	<2.5	<2.5	<2.6	<2.7	<2.5	<2.5	<2.7	<2.4	<2.6	<2.4	<2.9	<2.7	<2.4	<2.6	<2.4	<2.6	<2.6	<2.5	<2.6
Silver	2	180	1500	<0.62	<0.71	<0.62	<0.62	<0.65	<0.67	<0.61	<0.62	<0.68	<0.59	<0.64	0.64	<0.71	<0.68	<0.60	<0.64	<0.60	<0.65	<0.65	<0.63	<0.65
Sodium	-	-	-	<1200	<1400	<1200	<1200	<1300	<1300	<1200	<1200	<1400	<1200	<1300	<1200	<1400	<1400	<1200	<1300	<1200	<1300	<1300	<1300	<1300
Thallium	-			<1.2	<1.4	<1.2	<1.2	<1.3	<1.3	<1.2	<1.2	<1.4	<1.2	<1.3	<1.2	<1.4	<1.4	<1.2	<1.3	<1.2	<1.3	<1.3	<1.3	<1.3
Vanadium	-			25.1	48.7	7.2	6.9	14.3	37.4	<6.1	22.1	37	13.6	23.2	30	14.7	36.3	8.8	38.9	28.8	32.8	11.3	39.7	16.1
Zinc	109	10000	10000	20.7	55.2	13.2	14.1	31.4	42.5	<6.1	26.8	52.8	22.3	31.1	21.3	14	59.7	15.6	49.3	25.8	35	23.8	**145**	28.4

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits hiah. samole was ND.
b This compound in blank spike is outside in house QC limits bias hiah.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is ou
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of co

Table 11 - Soil Analytical Results
175 Roger Avenue - BCP Site No. C130164
Gas/Diesel Range Organics, Pesticides, Herbicides and PCBs in Soil

Client Sample ID: Lab Sample ID: Date Sampled: Matrix:	NY SCO Unrestricted Use (6 NYCRR 375-6 12/06)	NY SCO - Restricted Residential w/CP-51 (10/10) (6 NYCRR 375-6 12/06)	NY SCO - Commercial w/CP-51 (10/10) (6 NYCRR 375-6 (12/06)	SB-1 (14-15) JD7490-3 5/20/2020 Soil	SB-2 (20.5-21.5) JD7490-10 5/20/2020 Soil	SB-4 (10-14) JD7490-15 5/21/2020 Soil	SB-5 (7-8) JD7642-15 5/29/2020 Soil	SB-5 (10-11) JD7642-16 5/29/2020 Soil	SB-5 (18-19) JD7642-17 5/29/2020 Soil	SB-5 (29-30) JD7642-18 5/29/2020 Soil	SB-5 (34-35) JD7642-19 5/29/2020 Soil	SB-5 (34-35) DUP JD7642-20 5/29/2020 Soil	SB-7 (15-20) JD7623-8 5/26/2020 Soil	SB-11 (5-6) JD7642-21 5/29/2020 Soil	SB-11 (13-14) JD7642-22 5/29/2020 Soil	SB-11 (25-30) JD7642-23 5/29/2020 Soil	SB-13 (6-7) JD7642-6 5/28/2020 Soil	SB-14 (12-13) JD7623-20 5/27/2020 Soil
GC Volatiles (SW846 8015D) - values reported in mg/kg																		
TPH-GRO (C6-C10)	-	-	-	ND (5.8)	ND (6.2)	-	51.5	-	-	-	-	-	-	-	-	-	-	27.7
GC/LC Semi-volatiles (SW846 8015D) - values reported in mg/kg																		
TPH-DRO (C10-C28)	-	-	-	ND (7.8)	ND (8.4)	-	ND (8.3)	-	-	-	-	-	-	-	-	-	ND (8.7)	ND (11)
GC/LC Semi-volatiles (SW846 8081D) - values reported in ug/kg																		
Aldrin	5	97	680	-	-	-	-	ND (0.68)	ND (0.65)	ND (0.71)	ND (0.71)	ND (0.68)	-	ND (0.67)	ND (0.69)	ND (0.67)	-	-
alpha-BHC	20	480	3400	-	-	-	-	ND (0.67)	ND (0.64)	ND (0.70)	ND (0.70)	ND (0.67)	-	ND (0.66)	ND (0.68)	ND (0.66)	-	-
beta-BHC	36	360	3000	-	-	-	-	ND (0.74)	ND (0.72)	ND (0.78)	ND (0.78)	ND (0.74)	-	ND (0.73)	ND (0.75)	ND (0.74)	-	-
delta-BHC	40	100000	500000	-	-	-	-	ND (0.79)	ND (0.76)	ND (0.83)	ND (0.82)	ND (0.79)	-	ND (0.78)	ND (0.80)	ND (0.78)	-	-
gamma-BHC (Lindane)	100	1300	9200	-	-	-	-	ND (0.60)	ND (0.58)	ND (0.63)	ND (0.63)	ND (0.60)	-	ND (0.60)	ND (0.61)	ND (0.60)	-	-
alpha-Chlordane	94	4200	24000	-	-	-	-	ND (0.66)	ND (0.64)	ND (0.69)	ND (0.69)	ND (0.66)	-	ND (0.66)	ND (0.67)	ND (0.66)	-	-
gamma-Chlordane	-	-	-	-	-	-	-	ND (0.37)	ND (0.36)	ND (0.39)	ND (0.39)	ND (0.37)	-	ND (0.37)	ND (0.38)	ND (0.37)	-	-
Dieldrin	5	200	1400	-	-	-	-	ND (0.56)	ND (0.54)	ND (0.59)	ND (0.59)	ND (0.56)	-	ND (0.56)	ND (0.57)	ND (0.56)	-	-
4,4'-DDD	3.3	13000	92000	-	-	-	-	ND (0.75)	ND (0.73)	ND (0.79)	ND (0.79)	ND (0.75)	-	ND (0.75)	ND (0.77)	ND (0.75)	-	-
4,4'-DDE	3.3	8900	62000	-	-	-	-	ND (0.72)	ND (0.69)	ND (0.76)	ND (0.75)	ND (0.72)	-	ND (0.71)	ND (0.73)	ND (0.71)	-	-
4,4'-DDT	3.3	7900	47000	-	-	-	-	ND (0.73)	1.9	ND (0.76)	ND (0.76)	ND (0.73)	-	ND (0.72)	ND (0.74)	ND (0.72)	-	-
Endrin	14	11000	89000	-	-	-	-	ND (0.64)	ND (0.61)	ND (0.67)	ND (0.67)	ND (0.64)	-	ND (0.63)	ND (0.65)	ND (0.63)	-	-
Endosulfan sulfate	2400	24000	200000	-	-	-	-	ND (0.64)	ND (0.62)	ND (0.67)	ND (0.67)	ND (0.64)	-	ND (0.63)	ND (0.65)	ND (0.64)	-	-
Endrin aldehyde	-	-	-	-	-	-	-	ND (0.46)	ND (0.45)	ND (0.49)	ND (0.49)	ND (0.46)	-	ND (0.46)	ND (0.47)	ND (0.46)	-	-
Endosulfan-I	2400	24000	200000	-	-	-	-	ND (0.47)	ND (0.46)	ND (0.50)	ND (0.49)	ND (0.47)	-	ND (0.47)	ND (0.48)	ND (0.47)	-	-
Endosulfan-II	2400	24000	200000	-	-	-	-	ND (0.51)	ND (0.49)	ND (0.54)	ND (0.54)	ND (0.51)	-	ND (0.51)	ND (0.52)	ND (0.51)	-	-
Heptachlor	42	2100	15000	-	-	-	-	ND (0.71)	ND (0.68)	ND (0.74)	ND (0.74)	ND (0.71)	-	ND (0.70)	ND (0.72)	ND (0.70)	-	-
Heptachlor epoxide	-			-	-	-	-	ND (0.57)	ND (0.55)	ND (0.60)	ND (0.60)	ND (0.57)	-	ND (0.57)	ND (0.58)	ND (0.57)	-	-
Methoxychlor	-			-	-	-	-	ND (0.65)	ND (0.63)	ND (0.68)	ND (0.68)	ND (0.65)	-	ND (0.65)	ND (0.66)	ND (0.65)	-	-
Endrin ketone	-	-	-	-	-	-	-	ND (0.59)	ND (0.57)	ND (0.62)	ND (0.62)	ND (0.59)	-	ND (0.59)	ND (0.60)	ND (0.59)	-	-
Toxaphene	-	-	-	-	-	-	-	ND (19)	ND (18)	ND (20)	ND (20)	ND (19)	-	ND (19)	ND (19)	ND (19)	-	-
GC/LC Semi-volatiles (SW846 8082A) - values reported in ug/kg																		
Aroclor 1016	100	1000	1000	-	-	-	-	ND (19)	ND (18)	ND (20)	ND (20)	ND (19)	-	ND (19)	ND (19)	ND (19)	-	-
Aroclor 1221	100	1000	1000	-	-	-	-	ND (25)	ND (25)	ND (27)	ND (27)	ND (25)	-	ND (25)	ND (26)	ND (25)	-	-
Aroclor 1232	100	1000	1000	-	-	-	-	ND (26)	ND (25)	ND (27)	ND (27)	ND (26)	-	ND (26)	ND (27)	ND (26)	-	-
Aroclor 1242	100	1000	1000	-	-	-	-	ND (17)	ND (16)	ND (18)	ND (18)	ND (17)	-	ND (17)	ND (17)	ND (17)	-	-
Aroclor 1248	100	1000	1000	-	-	-	-	ND (37)	ND (35)	ND (38)	ND (38)	ND (37)	-	ND (36)	ND (37)	ND (36)	-	-
Aroclor 1254	100	1000	1000	-	-	-	-	ND (22)	ND (21)	ND (23)	ND (23)	ND (22)	-	ND (22)	ND (22)	ND (22)	-	-
Aroclor 1260	100	1000	1000	-	-	-	-	ND (17)	ND (17) [a]	ND (18) [a]	ND (18) [a]	ND (17) [a]	-	ND (17) [a]	ND (18) [a]	ND (17) [a]	-	-
Aroclor 1268	100	1000	1000	-	-	-	-	ND (17)	ND (17)	ND (18)	ND (18)	ND (17)	-	ND (17)	ND (18)	ND (17)	-	-
Aroclor 1262	100	1000	1000	-	-	-	-	ND (27)	ND (26)	ND (28)	ND (28)	ND (27)	-	ND (27)	ND (27)	ND (27)	-	-
GC/LC Semi-volatiles (sw846 8151A) - values reported in																		
2,4-D	-	-	-	-	-	-	-	ND (5.8)	ND (4.9)	ND (5.2)	ND (5.3)	ND (5.2)	-	ND (5.2)	ND (5.5)	-	-	-
2,4,5-TP (Silvex)	3800	100000	500000	-	-	-	-	ND (4.1)	ND (3.5)	ND (3.7)	ND (3.8)	ND (3.7)	-	ND (3.7)	ND (3.9)	-	-	-
2,4,5-T	-	-	-	-	-	-	-	ND (3.7)	ND (3.1)	ND (3.3)	ND (3.4)	ND (3.3)	-	ND (3.3)	ND (3.5)	-	-	-
General Chemistry																		
3 Inch Sieve	%	%	%	-	-	100	-	-	-	-	-	-	100	-	-	-	-	-
1.5 Inch Sieve	%	%	%	-	-	100	-	-	-	-	-	-	100	-	-	-	-	-
0.75 Inch Sieve	%	%	%	-	-	100	-	-	-	-	-	-	100	-	-	-	-	-
0.375 Inch Sieve	%	%	%	-	-	100	-	-	-	-	-	-	95.6	-	-	-	-	-
No.4 Sieve (4.75 mm)	%	%	%	-	-	95	-	-	-	-	-	-	84.1	-	-	-	-	-
No.8 Sieve (2.36 mm)	%	%	%	-	-	90.5	-	-	-	-	-	-	75.2	-	-	-	-	-
No.10 Sieve (2.00 mm)	%	%	%	-	-	89.5	-	-	-	-	-	-	74.2	-	-	-	-	-
No.16 Sieve (1.18 mm)	%	%	%	-	-	87.7	-	-	-	-	-	-	71.1	-	-	-	-	-
No.30 Sieve (0.60 mm)	%	%	%	-	-	85.7	-	-	-	-	-	-	68.1	-	-	-	-	-
No.50 Sieve (0.30 mm)	%	%	%	-	-	82.6	-	-	-	-	-	-	59.3	-	-	-	-	-
No.100 Sieve (0.15 mm)	%	%	%	-	-	76.1	-	-	-	-	-	-	22.8	-	-	-	-	-
No.200 Sieve (0.075 mm)	%	%	%	-	-	63.6	-	-	-	-	-	-	13.7	-	-	-	-	-
0.030 mm (Hydrometer)	%	%	%	-	-	47.8	-	-	-	-	-	-	9.1	-	-	-	-	-
0.005 mm (Hydrometer)	%	%	%	-	-	23.5	-	-	-	-	-	-	5.8	-	-	-	-	-
0.0015 mm (Hydrometer)	%	%	%	-	-	13.1	-	-	-	-	-	-	4.1	-	-	-	-	-
% Gravel	%	%	%	-	-	5	-	-	-	-	-	-	15.9	-	-	-	-	-
% Sand	%	%	%	-	-	31.4	-	-	-	-	-	-	70.3	-	-	-	-	-
% Silt, Clay, Colloids	%	%	%	-	-	63.6	-	-	-	-	-	-	13.7	-	-	-	-	-
Bulk Density (Dry Basis)	g/ml	g/ml	g/ml	-	-	1.3	-	-	-	-	-	-	1.4	-	-	1.6	1.5	-
Fraction Organic Carbon	kg/kg	kg/kg	kg/kg	0.000956	0.00042	-	0.000665	-	-	-	-	-	-	-	-	-	0.000819	0.0014
Solids, Percent	%	%	%	86.6	81	76.7	80.7	73.5	81	76.4	76.7	78.2	86.5	81	75.9	77.3	85.1	69
Total Organic Carbon	mg/kg	mg/kg	mg/kg	956	420	-	665	-	-	-	-	-	-	-	-	-	819	1400

Notes
ND - Non-Dectect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b This compound in blank spike is outside in house QC limits bias high.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Associated CCV outside of control limits low.
e Elevated detection limit due to dilution required for high interfering element.
f This compound in blank spike is outside in house QC limits bias high. Associated CCV outside of control limits high, sample was ND.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	MW-1	MW-2	MW-3	MW-3 DUP	MW-6	MW-8	MW-9	MW-13	MW-14	MW-15	MW-17	MW-18	MW-20	MW-22
Lab Sample ID:		JD1537-1	JD1455-1	JD1455-2	JD1455-3	JD1537-2	JD1455-4	JD1455-5	JD1455-6	JD1537-3	JD1537-4	JD1537-5	JD1537-6	JD1537-7	JD1537-8
Date Sampled:		1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
MS Volatiles (SW846 8260C) - values reported in ug/L															
Acetone	-	9.1 J	23.6	ND (6.0)	ND (30)	7.9 J	ND (6.0)	ND (6.0)	ND (120)	ND (150)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	7.9 J
Benzene	1	ND (0.43)	0.47 J	ND (0.43)	ND (2.1)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.5)	ND (11)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
Bromochloromethane	5	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.6)	ND (12)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
Bromodichloromethane	-	ND (0.58)	ND (0.58)	ND (0.58)	ND (2.9)	ND (0.58)	ND (0.58)	ND (0.58)	ND (12)	ND (15)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)
Bromoform	-	ND (0.63)	ND (0.63)	ND (0.63)	ND (3.2)	ND (0.63)	ND (0.63)	ND (0.63)	ND (13)	ND (16)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)
Bromomethane	5	ND (1.6) [a]	ND (1.6) [a]	ND (1.6) [a]	ND (8.2)	ND (1.6) [c]	ND (1.6) [a]	ND (1.6) [c]	ND (33) [c]	ND (41) [c]		ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6) [c]
2-Butanone (MEK)	-	ND (6.9)	ND (6.9)	ND (6.9)	ND (34)	ND (6.9)	ND (6.9)	ND (6.9)	ND (140)	ND (170)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)
n-Butylbenzene	5	ND (0.52)	ND (0.52)	ND (0.52)	ND (2.6)	ND (0.52)	ND (0.52)	ND (0.52)	ND (10)	ND (13)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)
sec-Butylbenzene	5	ND (0.62)	0.88 J	ND (0.62)	ND (3.1)	ND (0.62)	ND (0.62)	ND (0.62)	ND (12)	ND (16)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)
tert-Butylbenzene	5	ND (0.69)	ND (0.69)	ND (0.69)	ND (3.4)	ND (0.69)	ND (0.69)	ND (0.69)	ND (14)	ND (17)	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)
Carbon disulfide	60	ND (0.95)	ND (0.95)	ND (0.95)	ND (4.8)	ND (0.95)	ND (0.95)	ND (0.95)	ND (19)	ND (24)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)
Carbon tetrachloride	5	ND (0.55)	ND (0.55)	ND (0.55)	ND (2.8)	ND (0.55)	ND (0.55)	ND (0.55)	ND (11)	ND (14)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)
Chlorobenzene	5	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (14)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
Chloroethane	5	ND (0.73) [a]	ND (0.73) [a]	ND (0.73) [a]	ND (3.6)	ND (0.73)	ND (0.73) [a]	ND (0.73)	ND (15)	ND (18)	ND (0.73) [a]	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)
Chloroform	7	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
Chloromethane	5	ND (0.76) [a]	ND (0.76) [a]	ND (0.76) [a]	ND (3.8)	ND (0.76)	ND (0.76) [a]	ND (0.76)	ND (15)	ND (19)	ND (0.76) [a]	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)
Cyclohexane	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (3.9)	ND (0.78)	ND (0.78)	ND (0.78)	ND (16)	ND (20)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)
1,2-Dibromo-3-chloropropane	0.04	ND (1.2)	ND (1.2)	ND (1.2)	ND (6.0)	ND (1.2)	ND (1.2)	ND (1.2)	ND (24)	ND (30)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
Dibromochloromethane	-	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (14)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)
1,2-Dibromoethane	0.0006	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.5)	ND (12)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)
1,2-Dichlorobenzene	3	ND (0.53)	0.54 J	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,3-Dichlorobenzene	3	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (14)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,4-Dichlorobenzene	3	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	0.62 J	0.71 J	ND (0.51)	ND (0.51)
Dichlorodifluoromethane	5	ND (1.4)	ND (1.4)	ND (1.4)	ND (6.8)	ND (1.4)	ND (1.4)	ND (1.4)	ND (27)	ND (34)	ND (1.4) [a]	ND (1.4)	ND (1.4)	1.5 J	ND (1.4)
1,1-Dichloroethane	5	ND (0.57)	ND (0.57)	ND (0.57)	ND (2.8)	ND (0.57)	ND (0.57)	ND (0.57)	ND (11)	ND (14)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)
1,2-Dichloroethane	0.6	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
1,1-Dichloroethene	5	ND (0.59)	ND (0.59)	ND (0.59)	**6.7**	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
cis-1,2-Dichloroethene	5	0.56 J	ND (0.51)	1.2	**1690**	**11.1**	1.1	**120**	**298**	**276**	0.57 J	**22.3**	**68.2**	4.7	2.7
trans-1,2-Dichloroethene	5	ND (0.54)	ND (0.54)	ND (0.54)	**17.2**	ND (0.54)	ND (0.54)	2.2	ND (11)	ND (13)	ND (0.54)	ND (0.54)	1.2	ND (0.54)	ND (0.54)
1,2-Dichloropropane	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
cis-1,3-Dichloropropene	-	ND (0.47)	ND (0.47)	ND (0.47)	ND (2.4)	ND (0.47)	ND (0.47)	ND (0.47)	ND (9.4)	ND (12)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)
trans-1,3-Dichloropropene	-	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.2)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.6)	ND (11)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)
Ethylbenzene	5	ND (0.60)	3.7	ND (0.60)	ND (3.0)	**9.4**	2.6	0.63 J	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Freon 113	5	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.7)	ND (1.9)	ND (1.9)	ND (1.9)	ND (39)	ND (49)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
2-Hexanone	-	ND (2.0)	ND (2.0)	ND (2.0)	ND (10)	ND (2.0)	ND (2.0)	ND (2.0)	ND (41)	ND (51)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)
Isopropylbenzene	5	ND (0.65)	**45.2**	3.3	ND (3.2)	0.74 J	ND (0.65)	ND (0.65)	ND (13)	ND (16)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)
p-Isopropyltoluene	5	ND (0.66)	ND (0.66)	ND (0.66)	ND (3.3)	ND (0.66)	ND (0.66)	ND (0.66)	ND (13)	ND (16)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)
Methyl Acetate	-	ND (0.80)	ND (0.80)	ND (0.80)	ND (4.0)	ND (0.80)	ND (0.80)	ND (0.80)	ND (16)	ND (20)	ND (0.80) [e]	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)
Methylcyclohexane	-	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Methyl Tert Butyl Ether	10	ND (0.51)	ND (0.51)	ND (0.51)	5.4	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
4-Methyl-2-pentanone(MIBK)	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.3)	ND (1.9)	ND (1.9)	ND (1.9)	ND (37)	ND (46)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)
Methylene chloride	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Naphthalene	-	ND (2.5)	4.6 J	ND (2.5)	ND (13)	ND (2.5)	ND (2.5)	ND (2.5)	ND (50)	ND (63)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)
n-Propylbenzene	5	ND (0.60)	**29.5**	2.8	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)
Styrene	5	ND (0.70)	ND (0.70)	ND (0.70)	ND (3.5)	ND (0.70)	ND (0.70)	ND (0.70)	ND (14)	ND (17)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)
1,1,2,2-Tetrachloroethane	5	ND (0.65)	ND (0.65)	ND (0.65)	ND (3.3)	ND (0.65)	ND (0.65)	ND (0.65)	ND (13)	ND (16)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)
Tetrachloroethene	5	ND (0.90)	ND (0.90)	3.2	**2020**	**93**	1.9	**17**	**3050**	**3220**	**17.2**	**9.5**	**8.9**	0.93 J	**5.4**
Toluene	5	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
1,2,3-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,2,4-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)
1,1,1-Trichloroethane	5	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (13)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)
1,1,2-Trichloroethane	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)
Trichloroethene	5	ND (0.53)	ND (0.53)	1.3	**2650**	**53.2**	0.98 J	**22.7**	**1880**	**1940**	ND (0.53)	**11.5**	**12**	0.63 J	ND (0.53)
Trichlorofluoromethane	5	ND (0.84)	ND (0.84)	ND (0.84)	ND (4.2)	ND (0.84)	ND (0.84)	ND (0.84)	ND (17)	ND (21)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)
1,2,4-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	2.3	1.7 J	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,3,5-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl chloride	2	ND (0.79) [a]	ND (0.79) [a]	ND (0.79) [a]	**62.6**	ND (0.79)	ND (0.79) [a]	**16**	ND (16)	ND (20)	ND (0.79) [f]	**3.1**	**9.9**	ND (0.79)	ND (0.79)
m,p-Xylene	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (3.9)	10	ND (0.78)	ND (0.78)	ND (16)	ND (20)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)
o-Xylene	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)
Xylene (total)	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	**10**	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-1 (4-6)	TMP-1 (10-15)	TMP-1 (20-25)	TMP-1 (30-35)	TMP-2 (4-6)	TMP-2 (10-15)	TMP-2 (15-20)	TMP-2 (30-35)	TMP-2 (30-35)DUP	TMP-3 (4-6)	TMP-3 (15-20)	TMP-3 (20-25)	TMP-3 (30-35)	TMP-4 (4-6)	TMP-4 (15-20)	TMP-4 (20-25)	TMP-4 (30-35)	TMP-5 (4-6)	TMP-5 (10-15)	TMP-5 (15-20)	TMP-5 (30-35)
Lab Sample ID:		JD7495-1	JD7495-2	JD7495-3	JD7495-4	JD7495-7	JD7495-6	JD7495-8	JD7495-9	JD7495-10	JD7627-1	JD7627-2	JD7627-3	JD7627-4	JD7495-11	JD7495-12	JD7495-13	JD7495-14	JD7643-11	JD7643-12	JD7643-13	JD7643-14
Date Sampled:		5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/21/2020	5/20/2020	5/21/2020	5/21/2020	5/21/2020	5/22/2020	5/22/2020	5/22/2020	5/22/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/29/2020	5/29/2020	5/29/2020	5/29/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
MS Volatiles (SW846 8260C) - values reported in ug/L																						
Acetone	-	9.1 J	23.6	ND (6.0)	ND (30)	7.9 J	ND (6.0)	ND (6.0)	ND (120)	ND (150)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	7.9 J	ND (6.0)	ND (120)	ND (6.0)	ND (60)	ND (120)	ND (60)	ND (15)
Benzene	1	ND (0.43)	0.47 J	ND (0.43)	ND (2.1)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.5)	ND (11)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.5)	ND (0.43)	ND (4.3)	ND (8.5)	ND (4.3)	ND (1.1)
Bromochloromethane	5	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.6)	ND (12)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.6)	ND (0.48)	ND (4.8)	ND (9.6)	ND (4.8)	ND (1.2)
Bromodichloromethane	-	ND (0.58)	ND (0.58)	ND (0.58)	ND (2.9)	ND (0.58)	ND (0.58)	ND (0.58)	ND (12)	ND (15)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (12)	ND (0.58)	ND (5.8)	ND (12)	ND (5.8)	ND (1.5)
Bromoform	-	ND (0.63)	ND (0.63)	ND (0.63)	ND (3.2)	ND (0.63)	ND (0.63)	ND (0.63)	ND (13)	ND (16)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (13)	ND (0.63)	ND (6.3)	ND (13)	ND (6.3)	ND (1.6)
Bromomethane	5	ND (1.6) [a]	ND (1.6) [a]	ND (1.6) [a]	ND (8.2)	ND (1.6) [c]	ND (1.6) [a]	ND (1.6) [c]	ND (33) [c]	ND (41) [c]	ND (1.6) [a]	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6) [c]	ND (1.6) [c]	ND (33)	ND (1.6) [c]	ND (16)	ND (33)	ND (16)	ND (4.1)
2-Butanone (MEK)	-	ND (6.9)	ND (6.9)	ND (6.9)	ND (34)	ND (6.9)	ND (6.9)	ND (6.9)	ND (140)	ND (170)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (140)	ND (6.9)	ND (69)	ND (140)	ND (69)	ND (17)
n-Butylbenzene	5	ND (0.52)	ND (0.52)	ND (0.52)	ND (2.6)	ND (0.52)	ND (0.52)	ND (0.52)	ND (10)	ND (13)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (10)	ND (0.52)	**9.6 J**	ND (10)	ND (5.2)	ND (1.3)
sec-Butylbenzene	5	ND (0.62)	0.88 J	ND (0.62)	ND (3.1)	ND (0.62)	ND (0.62)	ND (0.62)	ND (12)	ND (16)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	0.68 J	ND (12)	ND (0.62)	**23.1**	**12.5 J**	**9.2 J**	1.6 J
tert-Butylbenzene	5	ND (0.69)	ND (0.69)	ND (0.69)	ND (3.4)	ND (0.69)	ND (0.69)	ND (0.69)	ND (14)	ND (17)	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)	4.1	ND (14)	ND (0.69)	ND (6.9)	ND (14)	ND (6.9)	ND (1.7)
Carbon disulfide	60	ND (0.95)	ND (0.95)	ND (0.95)	ND (4.8)	ND (0.95)	ND (0.95)	ND (0.95)	ND (19)	ND (24)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (19)	ND (0.95)	ND (9.5)	ND (19)	ND (9.5)	ND (2.4)
Carbon tetrachloride	5	ND (0.55)	ND (0.55)	ND (0.55)	ND (2.8)	ND (0.55)	ND (0.55)	ND (0.55)	ND (11)	ND (14)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (11)	ND (0.55)	ND (5.5)	ND (11)	ND (5.5)	ND (1.4)
Chlorobenzene	5	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (14)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (0.56)	ND (5.6)	ND (11)	ND (5.6)	ND (1.4)
Chloroethane	5	ND (0.73) [a]	ND (0.73) [a]	ND (0.73) [a]	ND (3.6)	ND (0.73)	ND (0.73) [a]	ND (0.73)	ND (15)	ND (18)	ND (0.73) [a]	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	1.6	ND (15)	ND (0.73)	ND (7.3)	ND (15)	ND (7.3)	ND (1.8)
Chloroform	7	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (0.50)	ND (5.0)	ND (10)	ND (5.0)	ND (1.3)
Chloromethane	5	ND (0.76) [a]	ND (0.76) [a]	ND (0.76) [a]	ND (3.8)	ND (0.76)	ND (0.76) [a]	ND (0.76)	ND (15)	ND (19)	ND (0.76) [a]	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (15)	ND (0.76)	ND (7.6)	ND (15)	ND (7.6)	ND (1.9)
Cyclohexane	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (3.9)	ND (0.78)	ND (0.78)	ND (0.78)	ND (16)	ND (20)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (16)	ND (0.78)	ND (7.8)	ND (16)	ND (7.8)	ND (2.0)
1,2-Dibromo-3-chloropropane	0.04	ND (1.2)	ND (1.2)	ND (1.2)	ND (6.0)	ND (1.2)	ND (1.2)	ND (1.2)	ND (24)	ND (30)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (24)	ND (1.2)	ND (12)	ND (24)	ND (12)	ND (3.0)
Dibromochloromethane	-	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (14)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (11)	ND (0.56)	ND (5.6)	ND (11)	ND (5.6)	ND (1.4)
1,2-Dibromoethane	0.0006	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.5)	ND (12)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (9.5)	ND (0.48)	ND (4.8)	ND (9.5)	ND (4.8)	ND (1.2)
1,2-Dichlorobenzene	3	ND (0.53)	0.54 J	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (0.53)	ND (5.3)	ND (11)	ND (5.3)	ND (1.3)
1,3-Dichlorobenzene	3	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (14)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (0.54)	ND (5.4)	ND (11)	ND (5.4)	ND (1.4)
1,4-Dichlorobenzene	3	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	0.62 J	0.71 J	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (0.51)	ND (5.1)	ND (10)	ND (5.1)	ND (1.3)
Dichlorodifluoromethane	5	ND (1.4)	ND (1.4)	ND (1.4)	ND (6.8)	ND (1.4)	ND (1.4)	ND (1.4)	ND (27)	ND (34)	ND (1.4) [a]	ND (1.4)	ND (1.4)	1.5 J	ND (1.4)	ND (1.4)	ND (27)	ND (1.4)	ND (14)	ND (27)	ND (14)	ND (3.4)
1,1-Dichloroethane	5	ND (0.57)	ND (0.57)	ND (0.57)	ND (2.8)	ND (0.57)	ND (0.57)	ND (0.57)	ND (11)	ND (14)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (11)	ND (0.57)	ND (5.7)	ND (11)	ND (5.7)	ND (1.4)
1,2-Dichloroethane	0.6	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (0.60)	ND (6.0)	ND (12)	ND (6.0)	ND (1.5)
1,1-Dichloroethene	5	ND (0.59)	ND (0.59)	ND (0.59)	**6.7**	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (0.59)	ND (5.9)	ND (12)	ND (5.9)	2.4 J
cis-1,2-Dichloroethene	5	0.56 J	ND (0.51)	1.2	**1690**	**11.1**	1.1	**120**	**298**	**276**	0.57 J	**22.3**	**68.2**	4.7	2.7	**205**	**4570**	**34.8**	**9.6 J**	**89.1**	ND (5.1)	**978**
trans-1,2-Dichloroethene	5	ND (0.54)	ND (0.54)	ND (0.54)	**17.2**	ND (0.54)	ND (0.54)	2.2	ND (11)	ND (13)	ND (0.54)	ND (0.54)	1.2	ND (0.54)	ND (0.54)	**7.1**	**132**	0.83 J	ND (5.4)	ND (11)	ND (5.4)	**8.1**
1,2-Dichloropropane	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (0.51)	ND (5.1)	ND (10)	ND (5.1)	ND (1.3)
cis-1,3-Dichloropropene	-	ND (0.47)	ND (0.47)	ND (0.47)	ND (2.4)	ND (0.47)	ND (0.47)	ND (0.47)	ND (9.4)	ND (12)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (9.4)	ND (0.47)	ND (4.7)	ND (9.4)	ND (4.7)	ND (1.2)
trans-1,3-Dichloropropene	-	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.2)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.6)	ND (11)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (8.6)	ND (0.43)	ND (4.3)	ND (8.6)	ND (4.3)	ND (1.1)
Ethylbenzene	5	ND (0.60)	3.7	ND (0.60)	ND (3.0)	**9.4**	2.6	0.63 J	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (0.60)	**3190**	**9470**	**1830**	**444**
Freon 113	5	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.7)	ND (1.9)	ND (1.9)	ND (1.9)	ND (39)	ND (49)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (39)	ND (1.9)	ND (19)	ND (39)	ND (19)	ND (4.9)
2-Hexanone	-	ND (2.0)	ND (2.0)	ND (2.0)	ND (10)	ND (2.0)	ND (2.0)	ND (2.0)	ND (41)	ND (51)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (41)	ND (2.0)	ND (20)	ND (41)	ND (20)	ND (5.1)
Isopropylbenzene	5	ND (0.65)	**45.2**	3.3	ND (3.2)	0.74 J	ND (0.65)	ND (0.65)	ND (13)	ND (16)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (13)	ND (0.65)	**627**	**652**	**218**	**50**
p-Isopropyltoluene	5	ND (0.66)	ND (0.66)	ND (0.66)	ND (3.3)	ND (0.66)	ND (0.66)	ND (0.66)	ND (13)	ND (16)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (13)	ND (0.66)	**11.7 J**	ND (13)	ND (6.6)	ND (1.6)
Methyl Acetate	-	ND (0.80)	ND (0.80)	ND (0.80)	ND (4.0)	ND (0.80)	ND (0.80)	ND (0.80)	ND (16)	ND (20)	ND (0.80) [a]	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (16)	ND (0.80)	ND (8.0)	ND (16)	ND (8.0)	ND (2.0)
Methylcyclohexane	-	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (0.60)	ND (6.0)	ND (12)	ND (6.0)	ND (1.5)
Methyl Tert Butyl Ether	10	ND (0.51)	ND (0.51)	ND (0.51)	5.4	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	ND (13)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (10)	1.9	ND (5.1)	ND (10)	ND (5.1)	ND (1.3)
4-Methyl-2-pentanone(MIBK)	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.3)	ND (1.9)	ND (1.9)	ND (1.9)	ND (37)	ND (46)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (37)	ND (1.9)	ND (19)	ND (37)	ND (19)	ND (4.6)
Methylene chloride	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (1.0)	ND (10)	ND (20)	ND (10)	ND (2.5)
Naphthalene	-	ND (2.5)	4.6 J	ND (2.5)	ND (13)	ND (2.5)	ND (2.5)	ND (2.5)	ND (50)	ND (63)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (50)	ND (2.5)	35.9 J	ND (50)	ND (25)	ND (6.3)
n-Propylbenzene	5	ND (0.60)	**29.5**	2.8	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (15)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (12)	ND (0.60)	**1100**	**1020**	**395**	**83.4**
Styrene	5	ND (0.70)	ND (0.70)	ND (0.70)	ND (3.5)	ND (0.70)	ND (0.70)	ND (0.70)	ND (14)	ND (17)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (14)	ND (0.70)	ND (7.0)	ND (14)	ND (7.0)	ND (1.7)
1,1,2,2-Tetrachloroethane	5	ND (0.65)	ND (0.65)	ND (0.65)	ND (3.3)	ND (0.65)	ND (0.65)	ND (0.65)	ND (13)	ND (16)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (13)	ND (0.65)	ND (6.5)	ND (13)	ND (6.5)	ND (1.6)
Tetrachloroethene	5	ND (0.90)	ND (0.90)	3.2	**2020**	**93**	1.9	**17**	**3050**	**3220**	**17.2**	**9.5**	**8.9**	0.93 J	**5.4**	**6.7**	**131**	**226**	**15.7**	**33.7**	**11.3**	**927**
Toluene	5	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (0.53)	**707**	**16100**	**937**	**331**
1,2,3-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (0.50)	ND (5.0)	ND (10)	ND (5.0)	ND (1.3)
1,2,4-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (13)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (10)	ND (0.50)	ND (5.0)	ND (10)	ND (5.0)	ND (1.3)
1,1,1-Trichloroethane	5	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (13)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (11)	ND (0.54)	ND (5.4)	ND (11)	ND (5.4)	ND (1.3)
1,1,2-Trichloroethane	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (13)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (11)	ND (0.53)	ND (5.3)	ND (11)	ND (5.3)	ND (1.3)
Trichloroethene	5	ND (0.53)	ND (0.53)	1.3	**2690**	**53.2**	0.98 J	**22.7**	**1880**	**1940**	ND (0.53)	**11.5**	**12**	0.63 J	ND (0.53)	**10.7**	**490**	**52.9**	ND (5.3)	ND (11)	ND (5.3)	**812**
Trichlorofluoromethane	5	ND (0.84)	ND (0.84)	ND (0.84)	ND (4.2)	ND (0.84)	ND (0.84)	ND (0.84)	ND (17)	ND (21)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (17)	ND (0.84)	ND (8.4)	ND (17)	ND (8.4)	ND (2.1)
1,2,4-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	2.3	1.7 J	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (1.0)	**3640**	**3850**	**1250**	**273**
1,3,5-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (25)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (20)	ND (1.0)	**1490**	**1270**	**416**	**93.8**
Vinyl chloride	2	ND (0.79) [a]	ND (0.79) [a]	ND (0.79) [a]	**62.6**	ND (0.79)	ND (0.79) [a]	**16**	ND (16)	ND (20)	ND (0.79) [f]	**3.1**	**9.9**	ND (0.79)	ND (0.79)	**66.7**	**461**	1.6	ND (7.9)	ND (16)	ND (7.9)	**37.1**
m,p-Xylene	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (3.9)	10	ND (0.78)	ND (0.78)	ND (16)	ND (20)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (16)	ND (0.78)	11500	34400	5660	1460
o-Xylene	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (0.59)	**3140**	**11300**	**1930**	**438**
Xylene (total)	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	**10**	ND (0.59)	ND (0.59)	ND (12)	ND (15)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (12)	ND (0.59)	**14600**	**45700**	**7590**	**1900**

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-6 (4-6)	TMP-6 (15-20)	TMP-6 (25-30)	TMP-6 (30-35)	TMP-7 (4-6)	TMP-7 (4-6) DUP	TMP-7 (10-15)	TMP-7 (15-20)	TMP-7 (30-35)	TMP-8 (5-10)	TMP-8 (10-15)	TMP-8 (20-25)	TMP-8 (30-35)	TMP-9 (4-6)	TMP-9 (10-15)	TMP-9 (25-30)	TMP-9 (30-35)	TMP-10 (4-6)	TMP-10 (15-20)	TMP-10 (25-30)	TMP-10 (30-35)
Lab Sample ID:		JD7627-19	JD7627-20	JD7627-21	JD7627-23	JD7627-5	JD7627-6	JD7627-7	JD7627-8	JD7627-9	JD7495-17	JD7495-16	JD7495-18	JD7495-19	JD7495-20	JD7495-21	JD7495-22	JD7495-23	JD7627-10	JD7627-11	JD7627-12	JD7627-14
Date Sampled:		5/27/2020	5/27/2020	5/27/2020	5/27/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020	5/22/2020	5/22/2020	5/22/2020	5/22/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
MS Volatiles (SW846 8260C) - values reported in ug/L																						
Acetone	-	6.7 J	ND (6.0)	ND (6.0)	ND (30)	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (60)	ND (6.0)	ND (6.0)	ND (6.0)	ND (60)	ND (6.0)	ND (6.0)	ND (60)	ND (30)	ND (6.0)	ND (6.0)	ND (15)	ND (12)
Benzene	1	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.1)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (4.3)	ND (0.43)	ND (0.43)	ND (0.43)	ND (4.3)	ND (0.43)	ND (0.43)	ND (4.3)	ND (2.1)	ND (0.43)	ND (0.43)	ND (1.1)	ND (0.85)
Bromochloromethane	5	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (4.8)	ND (0.48)	ND (0.48)	ND (0.48)	ND (4.8)	ND (0.48)	ND (0.48)	ND (4.8)	ND (2.4)	ND (0.48)	ND (0.48)	ND (1.2)	ND (0.96)
Bromodichloromethane	-	ND (0.58)	ND (0.58)	ND (0.58)	ND (2.9)	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (5.8)	ND (0.58)	ND (0.58)	ND (0.58)	ND (5.8)	ND (0.58)	ND (0.58)	ND (5.8)	ND (2.9)	ND (0.58)	ND (0.58)	ND (1.5)	ND (1.2)
Bromoform	-	ND (0.63)	ND (0.63)	ND (0.63) [a]	ND (3.2)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (6.3)	ND (0.63)	ND (0.63)	ND (0.63)	ND (6.3)	ND (0.63)	ND (0.63)	ND (6.3)	ND (3.2)	ND (0.63)	ND (0.63)	ND (1.6)	ND (1.3)
Bromomethane	5	ND (1.6)	ND (1.6)	ND (1.6)	ND (8.2)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (16)	ND (1.6) [c]	ND (1.6) [c]	ND (1.6) [c]	ND (16) [c]	ND (1.6) [c]	ND (1.6) [c]	ND (16) [a]	ND (8.2) [a]	ND (1.6)	ND (1.6)	ND (4.1)	ND (3.3)
2-Butanone (MEK)	-	ND (6.9)	ND (6.9)	ND (6.9)	ND (34)	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (69)	ND (6.9)	ND (6.9)	ND (6.9)	ND (69)	ND (6.9)	ND (6.9)	ND (69)	ND (34)	ND (6.9)	ND (6.9)	ND (17)	ND (14)
n-Butylbenzene	5	ND (0.52)	ND (0.52)	ND (0.52)	ND (2.6)	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (5.2)	ND (0.52)	ND (0.52)	ND (0.52)	ND (5.2)	ND (0.52)	ND (0.52)	ND (5.2)	ND (2.6)	ND (0.52)	ND (0.52)	ND (1.3)	ND (1.0)
sec-Butylbenzene	5	ND (0.62)	ND (0.62)	ND (0.62)	ND (3.1)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (6.2)	ND (0.62)	ND (0.62)	ND (0.62)	ND (6.2)	ND (0.62)	ND (0.62)	ND (6.2)	ND (3.1)	ND (0.62)	ND (0.62)	ND (1.6)	ND (1.2)
tert-Butylbenzene	5	ND (0.69)	ND (0.69)	ND (0.69)	ND (3.4)	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)	ND (6.9)	ND (0.69)	ND (0.69)	ND (0.69)	ND (6.9)	ND (0.69)	ND (0.69)	ND (6.9)	ND (3.4)	ND (0.69)	ND (0.69)	ND (1.7)	ND (1.4)
Carbon disulfide	60	ND (0.95)	ND (0.95)	ND (0.95)	ND (4.8)	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (9.5)	ND (0.95)	ND (0.95)	ND (0.95)	ND (9.5)	ND (0.95)	ND (0.95)	ND (9.5)	ND (4.8)	ND (0.95)	ND (0.95)	ND (2.4)	ND (1.9)
Carbon tetrachloride	5	ND (0.55)	ND (0.55)	ND (0.55)	ND (2.8)	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (5.5)	ND (0.55)	ND (0.55)	ND (0.55)	ND (5.5)	ND (0.55)	ND (0.55)	ND (5.5)	ND (2.8)	ND (0.55)	ND (0.55)	ND (1.4)	ND (1.1)
Chlorobenzene	5	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (5.6)	ND (0.56)	ND (0.56)	ND (0.56)	ND (5.6)	ND (0.56)	ND (0.56)	ND (5.6)	ND (2.8)	ND (0.56)	ND (0.56)	ND (1.4)	ND (1.1)
Chloroethane	5	ND (0.73)	ND (0.73)	ND (0.73)	ND (3.6)	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (7.3)	ND (0.73)	ND (0.73)	ND (0.73)	ND (7.3)	ND (0.73)	ND (0.73)	ND (7.3)	ND (3.6)	ND (0.73)	ND (0.73)	ND (1.8)	ND (1.5)
Chloroform	7	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (5.0)	ND (2.5)	ND (0.50)	ND (0.50)	ND (1.3)	ND (1.0)
Chloromethane	5	ND (0.76)	ND (0.76)	ND (0.76)	ND (3.8)	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (7.6)	ND (0.76)	ND (0.76)	ND (0.76)	ND (7.6)	ND (0.76)	ND (0.76)	ND (7.6)	ND (3.8)	ND (0.76)	ND (0.76)	ND (1.9)	ND (1.5)
Cyclohexane	-	ND (0.78) [e]	ND (0.78)	ND (0.78)	ND (3.9)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (7.8)	ND (0.78)	ND (0.78)	ND (0.78)	ND (7.8)	ND (0.78)	ND (0.78)	ND (7.8)	ND (3.9)	ND (0.78)	ND (0.78)	ND (2.0)	ND (1.6)
1,2-Dibromo-3-chloropropane	0.04	ND (1.2)	ND (1.2)	ND (1.2) [e]	ND (6.0)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (12)	ND (1.2)	ND (1.2)	ND (1.2)	ND (12)	ND (1.2)	ND (1.2)	ND (12)	ND (6.0)	ND (1.2)	ND (1.2)	ND (3.0)	ND (2.4)
Dibromochloromethane	-	ND (0.56)	ND (0.56)	ND (0.56) [e]	ND (2.8)	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (5.6)	ND (0.56)	ND (0.56)	ND (0.56)	ND (5.6)	ND (0.56)	ND (0.56)	ND (5.6)	ND (2.8)	ND (0.56)	ND (0.56)	ND (1.4)	ND (1.1)
1,2-Dibromoethane	0.0006	ND (0.48) [f]	ND (0.48) [f]	ND (0.48) [f]	ND (2.4) [f]	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (4.8)	ND (0.48)	ND (0.48)	ND (0.48)	ND (4.8)	ND (0.48)	ND (0.48)	ND (4.8)	ND (2.4)	ND (0.48)	ND (0.48)	ND (1.2)	ND (0.95)
1,2-Dichlorobenzene	3	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (5.3)	ND (2.7)	ND (0.53)	ND (0.53)	ND (1.3)	ND (1.1)
1,3-Dichlorobenzene	3	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (5.4)	ND (0.54)	ND (0.54)	ND (0.54)	ND (5.4)	ND (0.54)	ND (0.54)	ND (5.4)	ND (2.7)	ND (0.54)	ND (0.54)	ND (1.4)	ND (1.1)
1,4-Dichlorobenzene	3	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (5.1)	ND (0.51)	ND (0.51)	ND (0.51)	ND (5.1)	ND (0.51)	ND (0.51)	ND (5.1)	ND (2.5)	ND (0.51)	ND (0.51)	ND (1.3)	ND (1.0)
Dichlorodifluoromethane	5	ND (1.4)	ND (1.4)	ND (1.4)	ND (6.8)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (14)	ND (1.4)	ND (1.4)	ND (1.4)	ND (14)	ND (1.4)	ND (1.4)	ND (14)	ND (6.8)	ND (1.4)	ND (1.4)	ND (3.4)	ND (2.7) [e]
1,1-Dichloroethane	5	ND (0.57)	ND (0.57)	ND (0.57)	ND (2.8)	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (5.7)	ND (0.57)	ND (0.57)	ND (0.57)	ND (5.7)	ND (0.57)	ND (0.57)	ND (5.7)	ND (2.8)	ND (0.57)	ND (0.57)	ND (1.4)	ND (1.1)
1,2-Dichloroethane	0.6	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (6.0)	ND (3.0)	ND (0.60)	ND (0.60)	ND (1.5)	ND (1.2)
1,1-Dichloroethene	5	ND (0.59)	ND (0.59)	ND (0.59) [e]	ND (3.0)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (5.9)	ND (0.59)	ND (0.59)	ND (0.59)	**5.9 J**	ND (0.59)	ND (0.59)	ND (5.9)	ND (3.0)	ND (0.59)	ND (0.59)	ND (1.5)	2.5
cis-1,2-Dichloroethene	5	2.6	ND (0.51)	**186**	**744**	ND (0.51)	ND (0.51)	1.1	1.3	**1300**	ND (0.51)	ND (0.51)	**31.8**	**1970**	**112**	**6.6**	**1220**	**963**	2.1	**24.1**	**472**	**828**
trans-1,2-Dichloroethene	5	ND (0.54)	ND (0.54)	3.6	**7.4**	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	**10.8**	ND (0.54)	ND (0.54)	0.83 J	**26.8**	3.2	ND (0.54)	**29.2**	**14.1**	ND (0.54)	ND (0.54)	**7.9**	**7.3**
1,2-Dichloropropane	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (5.1)	ND (0.51)	ND (0.51)	ND (0.51)	ND (5.1)	ND (0.51)	ND (0.51)	ND (5.1)	ND (2.5)	ND (0.51)	ND (0.51)	ND (1.3)	ND (1.0)
cis-1,3-Dichloropropene	-	ND (0.47)	ND (0.47)	ND (0.47)	ND (2.4)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (4.7)	ND (0.47)	ND (0.47)	ND (0.47)	ND (4.7)	ND (0.47)	ND (0.47)	ND (4.7)	ND (2.4)	ND (0.47)	ND (0.47)	ND (1.2)	ND (0.94)
trans-1,3-Dichloropropene	-	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.2)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (4.3)	ND (0.43)	ND (0.43)	ND (0.43)	ND (4.3)	ND (0.43)	ND (0.43)	ND (4.3)	ND (2.2)	ND (0.43)	ND (0.43)	ND (1.1)	ND (0.86)
Ethylbenzene	5	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (6.0)	ND (3.0)	ND (0.60)	ND (0.60)	ND (1.5)	ND (1.2)
Freon 113	5	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.7)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (19)	ND (1.9)	ND (1.9)	ND (1.9)	ND (19)	ND (1.9)	ND (1.9)	ND (19)	ND (9.7)	ND (1.9)	ND (1.9)	ND (4.9)	ND (3.9)
2-Hexanone	-	ND (2.0)	ND (2.0)	ND (2.0)	ND (10)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (20)	ND (2.0)	ND (2.0)	ND (2.0)	ND (20)	ND (2.0)	ND (2.0)	ND (20)	ND (10)	ND (2.0)	ND (2.0)	ND (5.1)	ND (4.1)
Isopropylbenzene	5	ND (0.65)	ND (0.65)	ND (0.65)	ND (3.2)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (6.5)	ND (0.65)	ND (0.65)	ND (0.65)	ND (6.5)	ND (0.65)	ND (0.65)	ND (6.5)	ND (3.2)	ND (0.65)	ND (0.65)	ND (1.6)	ND (1.3)
p-Isopropyltoluene	5	ND (0.66)	ND (0.66)	ND (0.66)	ND (3.3)	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (6.6)	ND (0.66)	ND (0.66)	ND (0.66)	ND (6.6)	ND (0.66)	ND (0.66)	ND (6.6)	ND (3.3)	ND (0.66)	ND (0.66)	ND (1.6)	ND (1.3)
Methyl Acetate	-	ND (0.80)	ND (0.80)	ND (0.80)	ND (4.0)	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (8.0)	ND (0.80)	ND (0.80)	ND (0.80)	ND (8.0)	ND (0.80)	ND (0.80)	ND (8.0)	ND (4.0)	ND (0.80)	ND (0.80)	ND (2.0)	ND (1.6)
Methylcyclohexane	-	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (6.0)	ND (3.0)	ND (0.60)	ND (0.60)	ND (1.5)	ND (1.2)
Methyl Tert Butyl Ether	10	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (5.1)	ND (0.51)	ND (0.51)	ND (0.51)	5.2 J	ND (0.51)	ND (0.51)	ND (5.1)	ND (2.5)	ND (0.51)	ND (0.51)	ND (1.3)	1.7 J
4-Methyl-2-pentanone(MIBK)	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.3)	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (19)	ND (1.9)	ND (1.9)	ND (1.9)	ND (19)	ND (1.9)	ND (1.9)	ND (19)	ND (9.3)	ND (1.9)	ND (1.9)	ND (4.6)	ND (3.7)
Methylene chloride	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (10)	ND (5.0)	ND (1.0)	ND (1.0)	ND (2.5)	ND (2.0)
Naphthalene	-	ND (2.5)	ND (2.5)	ND (2.5)	ND (13)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (25)	ND (2.5)	ND (2.5)	ND (2.5)	ND (25)	ND (2.5)	ND (2.5)	ND (25)	ND (13)	ND (2.5)	ND (2.5)	ND (6.3)	ND (5.0)
n-Propylbenzene	5	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (0.60)	ND (6.0)	ND (0.60)	ND (0.60)	ND (6.0)	ND (3.0)	ND (0.60)	ND (0.60)	ND (1.5)	ND (1.2)
Styrene	5	ND (0.70)	ND (0.70)	ND (0.70)	ND (3.5)	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (7.0)	ND (0.70)	ND (0.70)	ND (0.70)	ND (7.0)	ND (0.70)	ND (0.70)	ND (7.0)	ND (3.5)	ND (0.70)	ND (0.70)	ND (1.7)	ND (1.4)
1,1,2,2-Tetrachloroethane	5	ND (0.65)	ND (0.65)	ND (0.65)	ND (3.3)	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (6.5)	ND (0.65)	ND (0.65)	ND (0.65)	ND (6.5)	ND (0.65)	ND (0.65)	ND (6.5)	ND (3.3)	ND (0.65)	ND (0.65)	ND (1.6)	ND (1.3)
Tetrachloroethene	5	ND (0.90)	ND (0.90)	**10.7**	**15.9**	1.1	1.1	ND (0.90)	ND (0.90)	**101**	4.4	**5.6**	**47.4**	**376**	**88.9**	**87.2**	**279**	**45.9**	**18.1**	**11.2**	**352**	**333**
Toluene	5	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (5.3)	ND (2.7)	ND (0.53)	ND (0.53)	ND (1.3)	ND (1.1)
1,2,3-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (5.0)	ND (2.5)	ND (0.50)	ND (0.50)	ND (1.3)	ND (1.0)
1,2,4-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (0.50)	ND (5.0)	ND (0.50)	ND (0.50)	ND (5.0)	ND (2.5)	ND (0.50)	ND (0.50)	ND (1.3)	ND (1.0)
1,1,1-Trichloroethane	5	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (5.4)	ND (0.54)	ND (0.54)	ND (0.54)	ND (5.4)	ND (0.54)	ND (0.54)	ND (5.4)	ND (2.7)	ND (0.54)	ND (0.54)	ND (1.3)	ND (1.1)
1,1,2-Trichloroethane	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (0.53)	ND (5.3)	ND (0.53)	ND (0.53)	ND (5.3)	ND (2.7)	ND (0.53)	ND (0.53)	ND (1.3)	ND (1.1)
Trichloroethene	5	ND (0.53)	ND (0.53)	**32.8**	**84.2**	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	**95**	ND (0.53)	ND (0.53)	**46.3**	**790**	**97.8**	**13.4**	**619**	**259**	0.84 J	**13.7**	**162**	**111**
Trichlorofluoromethane	5	ND (0.84)	ND (0.84)	ND (0.84)	ND (4.2)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (8.4)	ND (0.84)	ND (0.84)	ND (0.84)	ND (8.4)	ND (0.84)	ND (0.84)	ND (8.4)	ND (4.2)	ND (0.84)	ND (0.84)	ND (2.1)	ND (1.7)
1,2,4-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (10)	ND (5.0)	ND (1.0)	ND (1.0)	ND (2.5)	ND (2.0)
1,3,5-Trimethylbenzene	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (1.0)	ND (1.0)	ND (10)	ND (5.0)	ND (1.0)	ND (1.0)	ND (2.5)	ND (2.0)
Vinyl chloride	2	ND (0.79) [e]	ND (0.79)	**9.2**	**41.8**	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	**76.9**	ND (0.79)	ND (0.79)	**2.1**	**70.8**	**5.8**	ND (0.79)	**46.2**	**33**	ND (0.79)	1	**59**	**132**
m,p-Xylene	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (3.9)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (7.8)	ND (0.78)	ND (0.78)	ND (0.78)	ND (7.8)	ND (0.78)	ND (0.78)	ND (7.8)	ND (3.9)	ND (0.78)	ND (0.78)	ND (2.0)	ND (1.6)
o-Xylene	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (5.9)	ND (0.59)	ND (0.59)	ND (0.59)	ND (5.9)	ND (0.59)	ND (0.59)	ND (5.9)	ND (3.0)	ND (0.59)	ND (0.59)	ND (1.5)	ND (1.2)
Xylene (total)	5	ND (0.59)	ND (0.59)	ND (0.59)	ND (3.0)	ND (0.59)	ND (0.59)	ND (0.59)	ND (0.59)	ND (5.9)	ND (0.59)	ND (0.59)	ND (0.59)	ND (5.9)	ND (0.59)	ND (0.59)	ND (5.9)	ND (3.0)	ND (0.59)	ND (0.59)	ND (1.5)	ND (1.2)

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sampl
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sampl
d Elevated detection limit due to dilution required for
e Elevated sample detection limit due to difficult sam

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Volatile Organic Compounds in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-12 (4-6)	TMP-12 (4-6) DUP	TMP-12 (10-15)	TMP-12 (25-30)	TMP-12 (30-35)	TMP-13 (4-6)	TMP-13 (10-15)	TMP-13 (20-25)	TMP-13 (30-35)	TMP-14 (4-6)	TMP-14 (10-15)	TMP-14 (20-25)	TMP-14 (30-35)
Lab Sample ID:		JD7643-5	JD7643-6	JD7643-7	JD7643-8	JD7643-9	JD7643-1	JD7643-2	JD7643-3	JD7643-4	JD7627-15	JD7627-16	JD7627-17	JD7627-18
Date Sampled:		5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/27/2020	5/27/2020	5/27/2020	5/27/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
MS Volatiles (SW846 8260C) - values reported in ug/L														
Acetone	-	ND (6.0)	ND (6.0)	ND (6.0)	ND (6.0)	ND (30)	ND (300)	ND (60)	ND (30)	ND (300)	ND (15)	ND (600)	ND (15)	ND (30)
Benzene	1	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.1)	ND (21)	ND (4.3)	ND (2.1)	ND (21)	ND (1.1)	ND (43)	ND (1.1)	ND (2.1)
Bromochloromethane	5	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (2.4)	ND (24)	ND (4.8)	ND (2.4)	ND (24)	ND (1.2)	ND (48)	ND (1.2)	ND (2.4)
Bromodichloromethane	-	ND (0.58)	ND (0.58)	ND (0.58)	ND (0.58)	ND (2.9)	ND (29)	ND (5.8)	ND (2.9)	ND (29)	ND (1.5)	ND (58)	ND (1.5)	ND (2.9)
Bromoform	-	ND (0.63) [a]	ND (0.63) [a]	ND (0.63) [a]	ND (0.63) [a]	ND (3.2) [a]	ND (32) [a]	ND (6.3) [a]	ND (3.2) [a]	ND (32) [a]	ND (1.6)	ND (63)	ND (1.6)	ND (3.2) [a]
Bromomethane	5	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (8.2)	ND (82)	ND (16)	ND (8.2)	ND (82)	ND (4.1)	ND (160)	ND (4.1)	ND (8.2)
2-Butanone (MEK)	-	ND (6.9)	ND (6.9)	ND (6.9)	ND (6.9)	ND (34)	ND (340)	ND (69)	ND (34)	ND (340)	ND (17)	ND (690)	ND (17)	ND (34)
n-Butylbenzene	5	ND (0.52)	ND (0.52)	ND (0.52)	ND (0.52)	ND (2.6)	ND (26)	ND (5.2)	ND (2.6)	ND (26)	ND (1.3)	ND (52)	ND (1.3)	ND (2.6)
sec-Butylbenzene	5	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (3.1)	ND (31)	**7.7 J**	ND (3.1)	ND (31)	ND (1.6)	ND (62)	ND (1.6)	ND (3.1)
tert-Butylbenzene	5	ND (0.69)	ND (0.69)	ND (0.69)	ND (0.69)	ND (3.4)	ND (34)	ND (6.9)	ND (3.4)	ND (34)	ND (1.7)	ND (69)	ND (1.7)	ND (3.4)
Carbon disulfide	60	ND (0.95)	ND (0.95)	ND (0.95)	ND (0.95)	ND (4.8)	ND (48)	ND (9.5)	ND (4.8)	ND (48)	ND (2.4)	ND (95)	ND (2.4)	ND (4.8)
Carbon tetrachloride	5	ND (0.55)	ND (0.55)	ND (0.55)	ND (0.55)	ND (2.8)	ND (28)	ND (5.5)	ND (2.8)	ND (28)	ND (1.4)	ND (55)	ND (1.4)	ND (2.8)
Chlorobenzene	5	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (28)	ND (5.6)	ND (2.8)	ND (28)	ND (1.4)	ND (56)	ND (1.4)	ND (2.8)
Chloroethane	5	ND (0.73)	ND (0.73)	ND (0.73)	ND (0.73)	ND (3.6)	ND (36)	ND (7.3)	ND (3.6)	ND (36)	ND (1.8)	ND (73)	ND (1.8)	ND (3.6)
Chloroform	7	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (25)	ND (5.0)	ND (2.5)	ND (25)	ND (1.3)	ND (50)	ND (1.3)	ND (2.5)
Chloromethane	5	ND (0.76)	ND (0.76)	ND (0.76)	ND (0.76)	ND (3.8)	ND (38)	ND (7.6)	ND (3.8)	ND (38)	ND (1.9)	ND (76)	ND (1.9)	ND (3.8)
Cyclohexane	-	ND (0.78) [e]	ND (0.78) [e]	ND (0.78) [e]	ND (0.78) [e]	ND (3.9) [e]	ND (39) [e]	ND (7.8) [e]	ND (3.9) [e]	ND (39) [e]	ND (2.0) [e]	ND (78)	ND (2.0) [e]	ND (3.9)
1,2-Dibromo-3-chloropropane	0.04	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (6.0)	ND (60)	ND (12)	ND (6.0)	ND (60)	ND (3.0)	ND (120)	ND (3.0)	ND (6.0) [e]
Dibromochloromethane	-	ND (0.56)	ND (0.56)	ND (0.56)	ND (0.56)	ND (2.8)	ND (28) [e]	ND (5.6) [e]	ND (2.8)	ND (28)	ND (1.4)	ND (56)	ND (1.4)	ND (2.8) [e]
1,2-Dibromoethane	0.0006	ND (0.48) [g]	ND (0.48) [g]	ND (0.48) [g]	ND (0.48) [f]	ND (2.4) [g]	ND (24) [f]	ND (4.8) [f]	ND (2.4) [g]	ND (24) [g]	ND (1.2) [f]	ND (48) [f]	ND (1.2) [f]	ND (2.4) [f]
1,2-Dichlorobenzene	3	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (27)	ND (5.3)	ND (2.7)	ND (27)	ND (1.3)	ND (53)	ND (1.3)	ND (2.7)
1,3-Dichlorobenzene	3	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (27)	ND (5.4)	ND (2.7)	ND (27)	ND (1.4)	ND (54)	ND (1.4)	ND (2.7)
1,4-Dichlorobenzene	3	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (25)	ND (5.1)	ND (2.5)	ND (25)	ND (1.3)	ND (51)	ND (1.3)	ND (2.5)
Dichlorodifluoromethane	5	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (6.8)	ND (68) [e]	ND (14) [e]	ND (6.8)	ND (68)	ND (3.4)	ND (140)	ND (3.4)	ND (6.8)
1,1-Dichloroethane	5	ND (0.57)	ND (0.57)	ND (0.57)	ND (0.57)	ND (2.8)	ND (28)	ND (5.7)	ND (2.8)	ND (28)	ND (1.4)	ND (57)	ND (1.4)	ND (2.8)
1,2-Dichloroethane	0.6	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (30)	ND (6.0)	ND (3.0)	ND (30)	ND (1.5)	ND (60)	ND (1.5)	ND (3.0)
1,1-Dichloroethene	5	ND (0.59)	ND (0.59)	ND (0.59)	1	ND (3.0)	ND (30)	ND (5.9)	ND (3.0)	ND (30)	ND (1.5)	ND (59)	ND (1.5)	ND (3.0) [e]
cis-1,2-Dichloroethene	5	0.94 J	1.3	1.4	**269**	**849**	**3510**	**169**	**11.7**	**2650**	**11.2**	**123**	2.3 J	**1800**
trans-1,2-Dichloroethene	5	ND (0.54)	ND (0.54)	ND (0.54)	3.5	**8.2**	ND (27)	ND (5.4)	ND (2.7)	ND (27)	ND (1.3)	ND (54)	ND (1.3)	**11.8**
1,2-Dichloropropane	1	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (2.5)	ND (25)	ND (5.1)	ND (2.5)	ND (25)	ND (1.3)	ND (51)	ND (1.3)	ND (2.5)
cis-1,3-Dichloropropene	-	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (2.4)	ND (24)	ND (4.7)	ND (2.4)	ND (24)	ND (1.2)	ND (47)	ND (1.2)	ND (2.4)
trans-1,3-Dichloropropene	-	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (2.2)	ND (22)	ND (4.3)	ND (2.2)	ND (22)	ND (1.1)	ND (43)	ND (1.1)	ND (2.2)
Ethylbenzene	5	2.1	1.8	2	ND (0.60)	ND (3.0)	**7920**	**2550**	**333**	**249**	**426**	**7570**	**285**	**163**
Freon 113	5	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.7)	ND (97)	ND (19)	ND (9.7)	ND (97)	ND (4.9)	ND (190)	ND (4.9)	ND (9.7)
2-Hexanone	-	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (10)	ND (100)	ND (20)	ND (10)	ND (100)	ND (5.1)	ND (200)	ND (5.1)	ND (10)
Isopropylbenzene	5	0.72 J	ND (0.65)	0.91 J	ND (0.65)	ND (3.2)	**902**	**751**	**51.2**	**35.8 J**	**39.3**	**741**	**27.1**	**17.5**
p-Isopropyltoluene	5	ND (0.66)	ND (0.66)	ND (0.66)	ND (0.66)	ND (3.3)	ND (33)	ND (6.6)	ND (3.3)	ND (33)	ND (1.6)	ND (66)	ND (1.6)	ND (3.3)
Methyl Acetate	-	ND (0.80)	ND (0.80)	ND (0.80)	ND (0.80)	ND (4.0)	ND (40)	ND (8.0)	ND (4.0)	ND (40)	ND (2.0)	ND (80)	ND (2.0)	ND (4.0)
Methylcyclohexane	-	ND (0.60)	ND (0.60)	ND (0.60)	ND (0.60)	ND (3.0)	ND (30)	ND (6.0)	ND (3.0)	ND (30)	ND (1.5)	ND (60)	ND (1.5)	ND (3.0)
Methyl Tert Butyl Ether	10	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	2.8 J	ND (25)	ND (5.1)	ND (2.5)	ND (25)	ND (1.3)	ND (51)	ND (1.3)	2.6 J
4-Methyl-2-pentanone(MIBK)	-	ND (1.9)	ND (1.9)	ND (1.9)	ND (1.9)	ND (9.3)	ND (93)	ND (19)	ND (9.3)	ND (93)	ND (4.6)	ND (190)	ND (4.6)	ND (9.3)
Methylene chloride	5	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (5.0)	ND (50)	ND (10)	ND (5.0)	ND (50)	ND (2.5)	ND (100)	ND (2.5)	ND (5.0)
Naphthalene	-	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (13)	ND (130)	33.3 J	ND (13)	ND (130)	ND (6.3)	ND (250)	ND (6.3)	ND (13)
n-Propylbenzene	5	1.8 J	1.7 J	2.1	ND (0.60)	ND (3.0)	**1340**	**981**	**66.2**	**48.1 J**	**54.5**	**1120**	**35.9**	**23.3**
Styrene	5	ND (0.70)	ND (0.70)	ND (0.70)	ND (0.70)	ND (3.5)	ND (35)	ND (7.0)	ND (3.5)	ND (35)	ND (1.7)	ND (70)	ND (1.7)	ND (3.5)
1,1,2,2-Tetrachloroethane	5	ND (0.65)	ND (0.65)	ND (0.65)	ND (0.65)	ND (3.3)	ND (33)	ND (6.5)	ND (3.3)	ND (33)	ND (1.6)	ND (65)	ND (1.6)	ND (3.3)
Tetrachloroethene	5	ND (0.90)	ND (0.90)	ND (0.90)	**120**	**140**	**109**	**22.2**	**12.7**	**7610**	**7.5**	ND (90)	**5.3**	**297**
Toluene	5	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	**21800**	**3820**	**413**	**290**	2.3 J	**106**	3.6	ND (2.7)
1,2,3-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (25)	ND (5.0)	ND (2.5)	ND (25)	ND (1.3)	ND (50)	ND (1.3)	ND (2.5)
1,2,4-Trichlorobenzene	5	ND (0.50)	ND (0.50)	ND (0.50)	ND (0.50)	ND (2.5)	ND (25)	ND (5.0)	ND (2.5)	ND (25)	ND (1.3)	ND (50)	ND (1.3)	ND (2.5)
1,1,1-Trichloroethane	5	ND (0.54)	ND (0.54)	ND (0.54)	ND (0.54)	ND (2.7)	ND (27)	ND (5.4)	ND (2.7)	ND (27)	ND (1.3)	ND (54)	ND (1.3)	ND (2.7)
1,1,2-Trichloroethane	1	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (2.7)	ND (27)	ND (5.3)	ND (2.7)	ND (27)	ND (1.3)	ND (53)	ND (1.3)	ND (2.7)
Trichloroethene	5	ND (0.53)	ND (0.53)	ND (0.53)	**97.9**	**127**	**53.1**	**9.8 J**	4.6 J	**5440**	3	ND (53)	1.9 J	**197**
Trichlorofluoromethane	5	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (4.2)	ND (42)	ND (8.4)	ND (4.2)	ND (42)	ND (2.1)	ND (84)	ND (2.1)	ND (4.2)
1,2,4-Trimethylbenzene	5	2.7	3	2.6	ND (1.0)	ND (5.0)	**4850**	**3370**	**238**	**175**	**158**	**4080**	**105**	**67.4**
1,3,5-Trimethylbenzene	5	ND (1.0)	1.0 J	ND (1.0)	ND (1.0)	ND (5.0)	**1510**	**195**	**52.8**	ND (50)	**39.1**	**1360**	**36.5**	**19.2**
Vinyl chloride	2	ND (0.79)	ND (0.79)	ND (0.79)	**18.2**	**53.4**	ND (39) [e]	ND (7.9) [e]	ND (3.9)	**107**	ND (2.0) [e]	ND (79)	ND (2.0) [e]	**73.4**
m,p-Xylene	-	8.2	7.3	6.7	0.89 J	ND (3.9)	34400	7420	1260	989	1570	26500	948	578
o-Xylene	5	2.7	2.2	2.3	ND (0.59)	ND (3.0)	**14300**	**3050**	**480**	**343**	**6.3**	**685**	**28.7**	**15.8**
Xylene (total)	5	**10.9**	**9.5**	**9**	0.89 J	ND (3.0)	**48700**	**10500**	**1740**	**1330**	**1580**	**27200**	**977**	**594**

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sampl
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sampl
d Elevated detection limit due to dilution required for
e Elevated sample detection limit due to difficult sam

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Semi-Volatile Organic Compounds in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	MW-1	MW-2	MW-3	MW-3 DUP	MW-6	MW-8	MW-9	MW-13	MW-14	MW-15	MW-17	MW-18	MW-20	MW-22
Lab Sample ID:		JD1537-1	JD1455-1	JD1455-2	JD1455-3	JD1537-2	JD1455-4	JD1455-5	JD1455-6	JD1537-3	JD1537-4	JD1537-5	JD1537-6	JD1537-7	JD1537-8
Date Sampled:		1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
MS Semi-volatiles (SW846 8270D) - values reported in ug/L															
2-Chlorophenol	-	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.78)	ND (0.91)	ND (0.78)	ND (0.80)	ND (0.78)	ND (0.78)
4-Chloro-3-methyl phenol	-	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.99)	ND (0.85)	ND (0.87)	ND (0.85)	ND (0.85)
2,4-Dichlorophenol	1	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.4)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
2,4-Dimethylphenol	1	ND (2.3)	**4.7 J**	**11.5**	**9.9**	**13.7**	ND (2.3)	ND (2.3)	ND (2.3)	ND (2.3)	ND (2.7)	ND (2.3)	ND (2.4)	ND (2.3)	ND (2.3)
2,4-Dinitrophenol	1	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.7)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)
4,6-Dinitro-o-cresol	-	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.4)	ND (1.2)	ND (1.3)	ND (1.2)	ND (1.2)
2-Methylphenol	-	ND (0.85)	1.0 J	1.3 J	1.3 J	2.7	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.85)	ND (0.99)	ND (0.85)	ND (0.87)	ND (0.85)	ND (0.85)
3&4-Methylphenol	-	ND (0.84)	4.6	3.6	3.4	5.6	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.84)	ND (0.98)	ND (0.84)	ND (0.86)	ND (0.84)	ND (0.84)
2-Nitrophenol	-	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (0.91)	ND (1.1)	ND (0.91)	ND (0.94)	ND (0.91)	ND (0.91)
4-Nitrophenol	-	ND (1.1) [b]	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1) [b]	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1) [b]	ND (1.3) [b]	ND (1.1) [b]	ND (1.1) [b]	ND (1.1) [b]	ND (1.1) [b]
Pentachlorophenol	1	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.5)	ND (1.3)	ND (1.4)	ND (1.3)	ND (1.3)
Phenol	1	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.44)	ND (0.37)	ND (0.38)	ND (0.37)	ND (0.37)
2,3,4,6-Tetrachlorophenol	-	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.6)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
2,4,5-Trichlorophenol	-	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.5)	ND (1.3)	ND (1.3)	ND (1.3)	ND (1.3)
2,4,6-Trichlorophenol	-	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (0.88)	ND (1.0)	ND (0.88)	ND (0.91)	ND (0.88)	ND (0.88)
Acenaphthene	-	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	0.32 J	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.21)	ND (0.18)	ND (0.19)	ND (0.18)	ND (0.18)
Acenaphthylene	-	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.15)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)
Acetophenone	-	ND (0.20)	ND (0.20)	6	5.4	5.1	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.23)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Anthracene	-	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.23)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.20)
Atrazine	7.5	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.43)	ND (0.50)	ND (0.43)	ND (0.44)	ND (0.43)	ND (0.43)
Benzaldehyde	-	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.32)	ND (0.28)	ND (0.28)	ND (0.28)	ND (0.28)
Benzo(a)anthracene	-	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	0.20 J	ND (0.19)	ND (0.23)	ND (0.19)	0.20 J	ND (0.19)	ND (0.19)
Benzo(a)pyrene	ND	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.24)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.20)
Benzo(b)fluoranthene	-	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.23)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Benzo(g,h,i)perylene	-	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.38)	ND (0.32)	0.51 J	ND (0.32)	ND (0.32)
Benzo(k)fluoranthene	-	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.23)	ND (0.20)	0.39 J	ND (0.20)	ND (0.20)
4-Bromophenyl phenyl ether	-	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.45)	ND (0.38)	ND (0.40)	ND (0.38)	ND (0.38)
Butyl benzyl phthalate	-	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.44)	ND (0.51)	ND (0.44)	ND (0.45)	ND (0.44)	ND (0.44)
1,1'-Biphenyl	5	ND (0.20)	0.61 J	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.24)	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.20)
2-Chloronaphthalene	-	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.26)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)
4-Chloroaniline	5	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.38)	ND (0.32)	ND (0.33)	ND (0.32)	ND (0.32)
Carbazole	-	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.25)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)
Caprolactam	-	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.62)	ND (0.72)	ND (0.62)	ND (0.64)	ND (0.62)	ND (0.62)
Chrysene	-	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.20)	ND (0.17)	0.25 J	ND (0.17)	ND (0.17)
bis(2-Chloroethoxy)methane	5	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.31)	ND (0.26)	ND (0.27)	ND (0.26)	ND (0.26)
bis(2-Chloroethyl)ether	1	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.28)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
2,2'-Oxybis(1-chloropropane)	5	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.38)	ND (0.45)	ND (0.38)	ND (0.40)	ND (0.38)	ND (0.38)
4-Chlorophenyl phenyl ether	-	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.41)	ND (0.35)	ND (0.36)	ND (0.35)	ND (0.35)
2,4-Dinitrotoluene	5	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.53)	ND (0.61)	ND (0.53)	ND (0.54)	ND (0.53)	ND (0.53)
2,6-Dinitrotoluene	5	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.45)	ND (0.53)	ND (0.45)	ND (0.47)	ND (0.45)	ND (0.45)
3,3'-Dichlorobenzidine	5	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.48)	ND (0.56)	ND (0.48)	ND (0.50)	ND (0.48)	ND (0.48)
1,4-Dioxane	-	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.63)	ND (0.73)	ND (0.63)	ND (0.64)	ND (0.63)	ND (0.63)
Dibenzo(a,h)anthracene	-	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.37)	ND (0.32)	0.56 J	ND (0.32)	ND (0.32)
Dibenzofuran	-	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	0.24 J	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.24)	ND (0.21)	ND (0.22)	ND (0.21)	ND (0.21)
Di-n-butyl phthalate	50	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.55)	ND (0.47)	ND (0.49)	ND (0.47)	ND (0.47)
Di-n-octyl phthalate	-	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.26)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)
Diethyl phthalate	-	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.29)	ND (0.25)	ND (0.26)	ND (0.25)	ND (0.25)
Dimethyl phthalate	-	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.24)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)
bis(2-Ethylhexyl)phthalate	5	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.8)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)
Fluoranthene	-	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	0.20 J	ND (0.16)	ND (0.19)	ND (0.16)	ND (0.17)	ND (0.16)	ND (0.16)
Fluorene	-	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	0.38 J	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.16)	ND (0.19)	ND (0.16)	ND (0.17)	ND (0.16)	ND (0.16)
Hexachlorobenzene	0.04	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.31)	ND (0.36)	ND (0.31)	ND (0.32)	ND (0.31)	ND (0.31)
Hexachlorobutadiene	0.5	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.47)	ND (0.55)	ND (0.47)	ND (0.48)	ND (0.47)	ND (0.47)
Hexachlorocyclopentadiene	5	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (2.6)	ND (3.1)	ND (2.6)	ND (2.7)	ND (2.6)	ND (2.6)
Hexachloroethane	5	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.43)	ND (0.37)	ND (0.38)	ND (0.37)	ND (0.37)
Indeno(1,2,3-cd)pyrene	-	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.32)	ND (0.37)	ND (0.32)	ND (0.33)	ND (0.32)	ND (0.32)
Isophorone	-	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.31)	ND (0.26)	ND (0.27)	ND (0.26)	ND (0.26)
2-Methylnaphthalene	-	ND (0.20)	ND (0.20)	0.57 J	0.56 J	3	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	0.30 J	ND (0.20)	ND (0.21)	ND (0.20)	ND (0.20)
2-Nitroaniline	5	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.26)	ND (0.31)	ND (0.26)	ND (0.27)	ND (0.26)	ND (0.26)
3-Nitroaniline	5	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.37)	ND (0.43)	ND (0.37)	ND (0.38)	ND (0.37)	ND (0.37)
4-Nitroaniline	5	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.49)	ND (0.42)	ND (0.43)	ND (0.42)	ND (0.42)
Naphthalene	-	ND (0.22)	3.7	12	11.5	14.5	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.22)	ND (0.26)	ND (0.22)	ND (0.23)	ND (0.22)	ND (0.22)
Nitrobenzene	0.4	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.61)	ND (0.71)	ND (0.61)	ND (0.63)	ND (0.61)	ND (0.61)
N-Nitroso-di-n-propylamine	-	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.46)	ND (0.53)	ND (0.46)	ND (0.47)	ND (0.46)	ND (0.46)
N-Nitrosodiphenylamine	-	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.25)	ND (0.21)	ND (0.22)	ND (0.21)	ND (0.21)
Phenanthrene	-	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	0.23 J	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.19)	ND (0.17)	ND (0.17)	ND (0.17)	ND (0.17)
Pyrene	-	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.24)	ND (0.21)	ND (0.21)	ND (0.21)	ND (0.21)
1,2,4,5-Tetrachlorobenzene	5	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.35)	ND (0.41)	ND (0.35)	ND (0.36)	ND (0.35)	ND (0.35)

Notes:
ND - Non-Detect
J - Estimated Value

a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Lab Filtered Metals in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	MW-1	MW-2	MW-3	MW-3 DUP	MW-6	MW-8	MW-9	MW-13	MW-14	MW-15	MW-17	MW-18	MW-20	MW-22
Lab Sample ID:		JD1537-1F	JD1455-1	JD1455-2	JD1455-3	JD1537-2F	JD1455-4	JD1455-5	JD1455-6	JD1537-3F	JD1537-4F	JD1537-5F	JD1537-6F	JD1537-7F	JD1537-8F
Date Sampled:		1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Metals (Lab Filtered) Analysis - values reported in ug/L															
Aluminum	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Antimony	3	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	**8.7**	<6.0	<6.0	<6.0
Arsenic	25	<3.0	<3.0	6.9	6.8	<3.0	<3.0	<3.0	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Barium	1000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Beryllium	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Calcium	-	69200	35800	114000	118000	136000	39200	27800	78200	35300	50700	22300	57500	66900	71300
Chromium	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Iron	300	**1250**	**857**	**10700**	**11800**	**7070**	<100	<100	**4330**	**688**	<100	<100	<100	<100	<100
Lead	25	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Magnesium	-	8390	10600	14100	14900	9960	9020	11500	16400	10600	16000	<5000	8440	<5000	11300
Manganese	300	**620**	116	**589**	**599**	**665**	<15	146	**855**	**325**	<15	<15	<15	<15	62.2
Mercury	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	100	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Potassium	-	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	12800
Selenium	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Silver	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	20000	**62100**	12700	**46700**	**49000**	16900	**56800**	12000	**29300**	**46900**	13100	<10000	**31400**	**21000**	**60500**
Thallium	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vanadium	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zinc	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Lab Filtered Metals in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-1 (4-6)	TMP-1 (10-15)	TMP-1 (20-25)	TMP-1 (30-35)	TMP-2 (4-6)	TMP-2 (10-15)	TMP-2 (15-20)	TMP-2 (30-35)	TMP-2 (30-35)DUP	TMP-3 (4-6)	TMP-3 (15-20)	TMP-3 (20-25)	TMP-3 (30-35)	TMP-4 (4-6)	TMP-4 (15-20)	TMP-4 (20-25)	TMP-4 (30-35)
Lab Sample ID:		JD7495-1F	JD7495-2F	JD7495-3F	JD7495-4F	JD7495-7F	JD7495-6F	JD7495-8F	JD7495-9F	JD7495-10F	JD7627-1F	JD7627-2F	JD7627-3F	JD7627-4F	JD7495-11F	JD7495-12F	JD7495-13F	JD7495-14F
Date Sampled:		5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/21/2020	5/20/2020	5/21/2020	5/21/2020	5/21/2020	5/22/2020	5/22/2020	5/22/2020	5/22/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Metals (Lab Filtered) Analysis - values reported in ug/L																		
Aluminum	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Antimony	3	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Arsenic	25	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Barium	1000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Beryllium	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Calcium	-	43000	44900	44900	68200	63500	48000	52100	59400	60200	56600	40400	60200	17300	55300	31900	33600	51700
Chromium	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Iron	300	114	288	**1930**	<100	121	209	171	**352**	**805**	<100	**2150**	**3330**	**7680**	<100	<100	**1670**	<100
Lead	25	<3.0	<3.0	8.9	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Magnesium	-	13200	7460	8640	9010	7850	18000	6600	9710	9470	7920	8490	17000	8150	8200	5000	7180	7980
Manganese	300	<15	153	**5050**	**999**	**866**	**1430**	**914**	**315**	275	46.8	**1800**	**1710**	248	46.5	**610**	**792**	**493**
Mercury	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	100	<10	<10	<10	<10	<10	<10	14.2	<10	<10	<10	<10	<10	<10	<10	<10	11.2	<10
Potassium	-	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	13100	<10000	<10000	<10000	15700	<10000	<10000	<10000
Selenium	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Silver	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	20000	<10000	**94500**	**84900**	**29600**	**44900**	**179000**	**152000**	**24400**	**20100**	**81300**	**183000**	**151000**	**21100**	**30700**	**62800**	**148000**	19300
Thallium	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vanadium	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zinc	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Lab Filtered Metals in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-5 (4-6)	TMP-5 (10-15)	TMP-5 (15-20)	TMP-5 (30-35)	TMP-6 (4-6)	TMP-6 (15-20)	TMP-6 (25-30)	TMP-6 (30-35)	TMP-7 (4-6)	TMP-7 (4-6) DUP	TMP-7 (10-15)	TMP-7 (15-20)	TMP-7 (30-35)	TMP-8 (5-10)	TMP-8 (10-15)	TMP-8 (20-25)	TMP-8 (30-35)
Lab Sample ID:		JD7643-11F	JD7643-12F	JD7643-13F	JD7643-14F	JD7627-19F	JD7627-20F	JD7627-21F	JD7627-23F	JD7627-5F	JD7627-6F	JD7627-7F	JD7627-8F	JD7627-9F	JD7495-17F	JD7495-16F	JD7495-18F	JD7495-19F
Date Sampled:		5/29/2020	5/29/2020	5/29/2020	5/29/2020	5/27/2020	5/27/2020	5/27/2020	5/27/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/21/2020	5/21/2020	5/21/2020	5/21/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Metals (Lab Filtered) Analysis - valu																		
Aluminum	-	<200	<200	<200	<200	2170	<200	<200	<200	<200	320	-	<200	<200	<200	<200	<200	<200
Antimony	3	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Arsenic	25	<3.0	4.2	<3.0	<3.0	5.2	<3.0	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Barium	1000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	-	<200	<200	<200	<200	<200	<200
Beryllium	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Calcium	-	62700	41500	14600	65900	46600	39800	7820	6970	65100	53100	-	18500	38000	39000	72100	65600	34600
Chromium	50	<10	<10	<10	<10	<10	<10	<10	<10	13.7	10.3	-	<10	<10	<10	<10	<10	<10
Cobalt	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	<50	<50
Copper	200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
Iron	300	131	124	<100	**13900**	<100	**1070**	**659**	<100	<100	<100	-	120	**2710**	115	161	<100	**6530**
Lead	25	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Magnesium	-	6970	6880	<5000	41500	<5000	13500	5660	<5000	<5000	5580	-	<5000	10400	15400	27400	8860	25800
Manganese	300	147	117	**606**	**739**	<15	**2670**	145	105	<15	<15	-	**420**	**425**	43.9	62.8	**833**	**521**
Mercury	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	100	<10	<10	<10	<10	<10	14.3	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	11.9
Potassium	-	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	-	<10000	<10000	<10000	13900	<10000	<10000
Selenium	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
Silver	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
Sodium	20000	**39300**	19200	**96000**	**67300**	**20400**	**211000**	**88200**	**71800**	**70100**	**63200**	-	**117000**	**26400**	**65600**	**181000**	**150000**	**32900**
Thallium	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
Vanadium	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	<50	<50
Zinc	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	-	<20	<20	<20	<20	<20	<20

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of contro
b Associated CCV outside of contro
c Associated CCV outside of contro
d Elevated detection limit due to di
e Elevated sample detection limit d

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Lab Filtered Metals in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-9 (4-6)	TMP-9 (10-15)	TMP-9 (25-30)	TMP-9 (30-35)	TMP-10 (4-6)	TMP-10 (15-20)	TMP-10 (25-30)	TMP-10 (30-35)	TMP-12 (4-6)	TMP-12 (4-6) DU	TMP-12 (10-15)	TMP-12 (25-30)	TMP-12 (30-35)	TMP-13 (4-6)	TMP-13 (10-15)	TMP-13 (20-25)	TMP-13 (30-35)
Lab Sample ID:		JD7495-20F	JD7495-21F	JD7495-22F	JD7495-23F	JD7627-10F	JD7627-11F	JD7627-12F	JD7627-14F	JD7643-5F	JD7643-6F	JD7643-7F	JD7643-8F	JD7643-9F	JD7643-1F	JD7643-2F	JD7643-3F	JD7643-4F
Date Sampled:		5/22/2020	5/22/2020	5/22/2020	5/22/2020	5/26/2020	5/26/2020	5/26/2020	5/26/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020	5/28/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Metals (Lab Filtered) Analysis - valu																		
Aluminum	-	<200	<200	<200	<200	<200	<200	<200	<200	<200	209	<200	<200	<200	<200	<200	<200	<200
Antimony	3	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Arsenic	25	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	8.2	<3.0	<3.0	<3.0
Barium	1000	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Beryllium	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	5	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Calcium	-	111000	178000	43700	26500	81800	65200	51600	26000	21500	18500	24500	18900	18800	66000	135000	126000	65500
Chromium	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Iron	300	<100	<100	**6180**	**2410**	<100	**1420**	**5560**	**6270**	196	214	<100	**7270**	**5450**	**612**	**849**	**1600**	**710**
Lead	25	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Magnesium	-	8290	16200	23400	11200	8250	13800	33000	17000	<5000	<5000	9210	15300	11000	8160	19600	21500	9240
Manganese	300	**649**	**654**	**800**	**425**	266	**1710**	**987**	**422**	69.9	50.6	228	294	280	226	**1890**	**4860**	**641**
Mercury	0.7	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	100	<10	13.6	17.8	15.4	<10	15.2	15.3	11.6	<10	<10	<10	<10	<10	<10	<10	<10	<10
Potassium	-	<10000	<10000	<10000	<10000	11300	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000
Selenium	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Silver	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	20000	**23400**	**32200**	**55100**	**25000**	**43600**	**141000**	**54900**	**22900**	<10000	<10000	17600	**85700**	**54200**	**96900**	**120000**	**249000**	**26000**
Thallium	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vanadium	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zinc	-	<20	27.1	24.6	<20	<20	20.9	22.8	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of contro
b Associated CCV outside of contro
c Associated CCV outside of contro
d Elevated detection limit due to di
e Elevated sample detection limit d

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Lab Filtered Metals in Groundwater (ug/L)

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	TMP-14 (4-6)	TMP-14 (10-15)	TMP-14 (20-25)	TMP-14 (30-35)
Lab Sample ID:		JD7627-15F	JD7627-16F	JD7627-17F	JD7627-18F
Date Sampled:		5/27/2020	5/27/2020	5/27/2020	5/27/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater
Metals (Lab Filtered) Analysis - valu					
Aluminum	-	<200	<200	<200	<200
Antimony	3	<6.0	<6.0	<6.0	<6.0
Arsenic	25	<3.0	<3.0	<3.0	<3.0
Barium	1000	<200	<200	<200	<200
Beryllium	-	<1.0	<1.0	<1.0	<1.0
Cadmium	5	<3.0	<3.0	<3.0	<3.0
Calcium	-	112000	71800	78600	55400
Chromium	50	<10	<10	<10	<10
Cobalt	-	<50	<50	<50	<50
Copper	200	<10	<10	<10	<10
Iron	300	<100	204	**3550**	**304**
Lead	25	<3.0	<3.0	<3.0	<3.0
Magnesium	-	14700	19600	22800	11200
Manganese	300	175	158	**1820**	**623**
Mercury	0.7	<0.20	<0.20	<0.20	<0.20
Nickel	100	<10	<10	11.7	<10
Potassium	-	<10000	<10000	<10000	<10000
Selenium	10	<10	<10	<10	<10
Silver	50	<10	<10	<10	<10
Sodium	20000	**21800**	**39200**	**194000**	**29300**
Thallium	-	<10	<10	<10	<10
Vanadium	-	<50	<50	<50	<50
Zinc	-	<20	<20	<20	<20

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of contro
b Associated CCV outside of contro
c Associated CCV outside of contro
d Elevated detection limit due to di
e Elevated sample detection limit d

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
General Chemistry Organic Compounds in Groundwater

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)	MW-1	MW-2	MW-3	MW-3 DUP	MW-6	MW-8	MW-9	MW-13	MW-14	MW-15	MW-17	MW-18	MW-20	MW-22
Lab Sample ID:		JD1537-1	JD1455-1	JD1455-2	JD1455-3	JD1537-2	JD1455-4	JD1455-5	JD1455-6	JD1537-3	JD1537-4	JD1537-5	JD1537-6	JD1537-7	JD1537-8
Date Sampled:		1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/9/2020	1/9/2020	1/9/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020	1/10/2020
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
GC Volatiles (RSK-175) - values reported in ug/L															
Methane	-	11	63	6950	5060	0.74	11.1	-	ND (0.060)	-	ND (0.060)	0.13	ND (0.060)	0.28	0.28
Carbon Dioxide	-	3920	18200	17600	19900	1920	1610	-	3840	-	1840	5900	2680	4510	4510
General Chemistry - values reported in mg/L															
Alkalinity, Total as CaCO3	-	80.0 [c]	78.0 [c]	360 [c]	212 [c]	118 [c]	91.0 [c]	-	42.0 [c]	-	47.0 [c]	94.0 [c]	80.0 [c]	94.0 [c]	94.0 [c]
Chloride	250	53.9	5.9	15.6	12.4	65.2	18.8	-	58.5	-	6.4	14.1	16.3	49.4	49.4
Iron, Ferrous	-	<0.20 [d]	<0.20 [d]	<0.20 [d]	0.68 [d]	<0.20 [d]	<0.20 [d]	-	<0.20 [d]	-	<0.20 [d]	<0.20 [d]	<0.20 [d]	<0.20 [d]	<0.20 [d]
Nitrogen, Nitrate	10	0.69 [e]	0.23 [e]	<0.11 [e]	0.35 [e]	0.76 [e]	0.18 [e]	-	<0.11 [e]	-	0.74 [e]	2.2 [e]	5.3 [e]	**10.5 [e]**	**10.5 [e]**
Nitrogen, Nitrate + Nitrite	10	0.69	0.24	<0.10	0.35	0.78	0.18	-	<0.10	-	0.74	2.2	5.3	**10.5**	**10.5**
Nitrogen, Nitrite	1	<0.010	0.015	<0.010	<0.010	0.025	<0.010	-	<0.010	-	<0.010	0.031	<0.010	0.037	0.037
Solids, Total Dissolved	500	430	196	470	458	284	185	-	277	-	125	292	272	455	455
Sulfate	250	90.1	11.9	19.6	21.4	21.7	18.1	-	71.2	-	18.7	46.8	56.3	-	-
Sulfide	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0
Total Organic Carbon	-	6	10.3	10.8	7.6	3.4	3.2	-	3	-	2.9	2.9	3.1	3.6	3.6

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

Table 12 - Groundwater Analytical Results
175 Roger Avenue - BCP Site No. C130164
Low-Level VOCs (ug/L) and PFAS/PFOS Compounds (ng/L) in Groundwater

Client Sample ID:	NY TOGS Class GA GW Standards (NYSDEC 6/2004)[1]	MW-1	MW-1 DUP
Lab Sample ID:		JD1553-1	JD1553-2
Date Sampled:		1/10/2020	1/10/2020
Matrix:		Groundwater	Groundwater
MS Semi-volatiles (SW846 8270D BY SIM) - values reported in ug/L			
1,4-Dioxane	-	ND (0.048)	ND (0.048)
MS Semi-volatiles (EPA 537M BY ID) - values reported in ng/L			
Perfluorobutanoic acid	-	24	22.6
Perfluoropentanoic acid	-	18	17
Perfluorohexanoic acid	-	15.7	15.7
Perfluoroheptanoic acid	-	17.7	16.5
Perfluorooctanoic acid	-	46.6	43.7
Perfluorononanoic acid	-	2.59	2.43
Perfluorodecanoic acid	-	ND (0.89)	ND (0.89)
Perfluoroundecanoic acid	-	ND (0.89)	ND (0.89)
Perfluorododecanoic acid	-	ND (1.3)	ND (13)
Perfluorotridecanoic acid	-	ND (0.89)	ND (8.9) [a]
Perfluorotetradecanoic acid	-	ND (0.89)	ND (8.9) [a]
Perfluorobutanesulfonic acid	-	3.19	3.46
Perfluorohexanesulfonic acid	-	9.83	9.15
Perfluoroheptanesulfonic acid	-	ND (0.89)	0.940 J
Perfluorooctanesulfonic acid	-	16.4	15.5
Perfluorodecanesulfonic acid	-	ND (0.89)	ND (0.89)
PFOSA	-	ND (0.89)	ND (8.9)
MeFOSAA	-	ND (3.6)	ND (3.6)
EtFOSAA	-	ND (3.6)	ND (3.6)
6:2 Fluorotelomer sulfonate	-	ND (1.8)	ND (1.8)
8:2 Fluorotelomer sulfonate	-	ND (1.8)	ND (1.8)

Notes:
ND - Non-Detect
J - Estimated Value
a Associated CCV outside of control limits high, sample was ND.
b Associated CCV outside of control limits low.
c Associated CCV outside of control limits high, sample was ND. This compound in blank spike is outside in house QC limits bias high.
d Elevated detection limit due to dilution required for high interfering element.
e Elevated sample detection limit due to difficult sample matrix.

APPENDIX C

Citizen Participation Plan

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
175 Roger Avenue Commercial Development

July 2019

Brownfield Cleanup Program Site No. C130164
175 Roger Avenue
Inwood
Nassau County, New York

Contents

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* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Inwood 175, LLC & AJM Capital II, LLC**
Site Name: **175 Roger Avenue Commercial Development**
Site Address: **175 Roger Avenue, Inwood, NY**
Site County: **Nassau County**
Site Number: **C130164**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The

flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, it has been determined that the site poses a significant threat.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Impacts from the Site include various contaminants in soil, groundwater, and soil gas. The current extent of the contamination will be further characterized in the upcoming remedial investigation. Stakeholders that may have an interest in the remedial investigation include nearby property owners and residents, town officials, and water district officials.

Although there is some site contamination, there is minimal exposure to the public.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The property is located at 175 Roger Avenue (the Site) in Inwood, Town of Hempstead, Nassau County. Historically, the Site consists of a 3.55-acre parcel that was developed with a 155,000 square foot, one story, warehouse building and a two-story warehouse and office. The Site was constructed in several stages from 1954 through 1967.

Nassau County began demolition of the former building in October 2018 and completed demolition in February 2019. The Site is currently vacant and unimproved. The poured concrete floor of the former building occupies approximately one-third of the Site. The balance of the Site is covered with asphalt except for two small areas of exposed soil in the northeast corner and south-central portion of the Site. The Site is topographically flat and is set in a mixed commercial / residential area bound by Roger Avenue to the north, Gates Avenue to the east, and residential buildings to the south and Expeditors Freight Service to the west. The northwest adjacent property was formerly operated by Eastern Shell Petroleum Products Company. Approximately 15,000-20,000 tons of petroleum contaminated soil has been removed from the Shell property. A Site Location Map is located in Appendix C.

History of Site Use, Investigation, and Cleanup

The Site operated as a "Sheet Metal Fabrication" factory since at least 1961. Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste material improperly stored and

disposed of on-Site. During a Site inspection in 1992, the United States Environmental Protection Agency (EPA) discovered approximately (240) 55-gallon deteriorated and/or leaking drums, a 5,000 gallon tanker trailer, underground storage tanks (USTs), and observed dry wells containing sludge materials. In 1993 the EPA conducted an Emergency Removal Action where the drums, tanker trailer, (1) 1,000-gallon heating oil UST, and UST piping were removed.

The Site was then used largely as a warehouse by various tenants from 1990 to 2004 including an auto repair shop (Gunter Auto Shop) and Long Island Party Rentals. The Site was acquired by Nassau County in 1995 and has remained vacant since approximately 2004. The warehouse building on Site was damaged in a fire in February 2011.

A Site Investigation conducted by ATC Associates Inc. in May 2005 included an electromagnetic ground penetrating radar (EM/GPR) survey that identified seven (7) underground anomalies thought to be USTs and/or buried drums. It is not clear if these tanks remain on the Site. The underground anomalies will be further investigated during the supplemental remedial investigation.

The Site was investigated in several previous environmental investigations and remedial documents beginning in 2005. The studies investigated soils, groundwater, soil vapor, Site history, and adjacent land use. Previous investigations relevant documents include the following:

1. *Phase I Environmental Site Assessment of Long Island Party Rentals,* 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 19, 2005.

2. *Site Investigation Report Long Island Party Rentals,* 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., June 27, 2005.

3. *NYSDEC Brownfield Cleanup Program Remedial Investigation Work Plan,* 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2007.

4. *NYSDEC Brownfield Cleanup Program Remedial Investigation Report,* 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., July 8, 2009.

5. *NYSDEC Brownfield Cleanup Program Alternative Analysis Report Remedial Work Plan,* 175 Roger Avenue, Inwood, New York 11096. ATC Associates Inc., April 20, 2010.

6. *Draft Phase I Environmental Site Assessment,* 175 Roger Avenue, Inwood, New York 11096. Fleming-Lee Shue, Inc., November 2018.

Contamination was found in soil, groundwater, and soil vapor. No cleanup occurred following investigation reports. There are several deficiencies found in the current dataset, which prevents the Site from being adequately characterized. This is why further delineation of site contaminants is being performed as part of the supplemental remedial investigation.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the Site will be used for commercial use as a warehouse.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant will conduct an investigation of the Site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;

3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the Site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be

taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

John Sheehan
Project Manager
NYSDEC Region 1
Division of Environmental Remediation
50 Circle Road
Stony Brook, NY
631-444-0244

Bill Fonda
Citizen Participation Specialist
NYSDEC
50 Circle Road
Stony Brook, NY
631-444-0350

New York State Department of Health (NYSDOH):

Dan Tucholski
Public Health Specialist II
NYSDOH
Bureau of Environmental Exposure Investigation
Corning Tower Room 1787
Empire State Plaza
Albany, NY 12237
518-402-7860

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Peninsula Public Library
280 Central Avenue
Lawrence, NY 11559
Phone: 516-239-3262
Hours:

Monday - Thursday	9 AM – 9 PM
Friday	9 AM – 6 PM
Saturday	9 AM – 1 PM
Sunday	9 AM – 1 PM

NYSDEC Region 1
50 Circle Road
Stony Brook, NY
631-444-0240
Hours:
Mon-Fri 8:30 AM – 4:45 PM (call for appointment)

Appendix B - Site Contact List

1. **The chief executive officer and planning board chairperson of each county, city, town and village in which the property is located.**

Nassau County

Nassau County Executive
Laura Curran
1550 Franklin Avenue Mineola NY 11501
516-571-3131

Nassau County Planning Department
Sean Sallie, Deputy Commissioner
1194 Prospect Avenue
Westbury, NY 11590
516-571-9600

Nassau County Department of Health
Susan King
200 County Seat Drive
Mineola, NY 11501

Nassau County Legislature – District 4
The Honorable Denise Ford
1550 Franklin Avenue
Mineola, NY 11501

Nassau County Legislature – District 3
The Honorable Carrie Solages
1550 Franklin Avenue
Mineola, NY 11501

Nassau County Department of Public Works
Ken Arnold, Acting Commissioner
1194 Prospect Avenue
Westbury, NY 11590

Town of Hempstead

Supervisor/ Chief Executive Officer of Town of Hempstead

Laura A. Gillen
1 Washington Street
Hempstead NY 11550
516-812-3260

Hempstead Town Board – District 3
The Honorable Bruce Blakeman
One Washington Street
Hempstead NY 11550

Planning and Economics
George L. Bakich, Commissioner
One Washington Street
Hempstead, NY 11550
516-812-7341

Inwood Civic Association
Vickie Mauro, President
202 Wanser Avenue
Inwood, NY 11096

2. Residents, owners, and occupants of the property and properties adjacent to the property.

Current Owner
Nassau County
1 West Street
Mineola, NY 11501

Prospective/Future Owner
AJM Capital, LLC
Inwood 175, LLC
P.O. Box 234800
Great Neck, NY 11023-4800

Occupants
Site is vacant and currently has no occupants.

Properties Adjacent
Sony Picture Entertainment
150 Roger Avenue
Inwood, NY, 11096

(718) 868-5800

Metro Marine Express
180 Roger Avenue
Inwood, NY, 11096

Expeditors International
245 Roger Avenue
Inwood, NY, 11096
(516) 371-3330

Ace Designs Fences, Awnings, Iron Works
574 Bayview Avenue
Inwood, NY, 11096
(516) 371-6444

MGR Equipment Corporation
22 Gates Avenue
Inwood, NY, 11096

D. Daniels Contracting LTD.
32 Gates Avenue
Inwood, NY 11096

Fanny, Theresa and Thomas Chase
542 Bayview Avenue
Inwood, NY 11096
(516) 371-1940

Daniel and James Zito
554 Bayview Avenue
Inwood, NY, 11096

Randolph and Cecilia Balzer
562 Bayview Avenue
Inwood, NY, 11096

Joseph and Christine Chase
568 Bayview Avenue
Inwood, NY, 11096

Estela and Balmory Gonzalez

41 Cerro Street
Inwood, NY 11096
(516) 371-0680

Michael and Cynthia Filippone
598 Bayview Avenue
Inwood, NY 11096

3. Local news media from which the community typically obtains information.

The Daily News
450 W. 33rd St.
New York, NY 10001

Queens Chronicle
PO Box 74-7769
Rego Park, NY 11374-7769

Jeff Bessen, Editor
Long Island Herald – Nassau Herald
2 Endo Boulevard
Garden City, NY, 11530

Long Island Press, Editor
6901 Jericho Tpke.
Suite 215
Syosset, NY 11791
516-284-3331

Long Island.com
https://www.longisland.com/inwood/news/

David M. Schwartz
Newsday
235 Pinelawm Road
Melville, NY 11747
631-843-2718

Assignment Desk
News 12
1 Media Crossways
Woodbury, NY 11797

516-393-1200

4. The public water supplier which services the area in which the property is located.

New York American Water
60 Brooklyn Avenue
Merrick, NY 11566
(877) 426-6999

5. Any person who has requested to be placed on the contact list

At this time no additional people have requested to be placed on this contact list.

6. The administrator of any school or day care facility located on or near the property.

There are no schools or day care facilities located on or near (within 0.5 miles) of the property. The closest schools are as follows:

Distance: 0.5 miles
Lawrence Primary at #2 School
Ms. Christine Moore
1 Donahue Ave
Inwood, NY 11096
(516) 295-6200

Distance: 1.2 miles
Lawrence Elementary School at Broadway
Ms. Rina Beach
195 Broadway
Lawrence, NY 11559

Distance: 1.2 miles
Lawrence Middle School at Broadway
Mr. Willis Perry
195 Broadway
Lawrence, NY 11559

Distance: 1.6 miles
Lawrence High School
Dr. Jennifer Lagnado Papp
2 Reilly Rd.
Cedarhurst, NY 11516

The closest Day Care facilities to the Site are:

Distance: 0.3 miles
A Smart Start Preschool
73 Bayswater Blvd.
Inwood, NY 11096

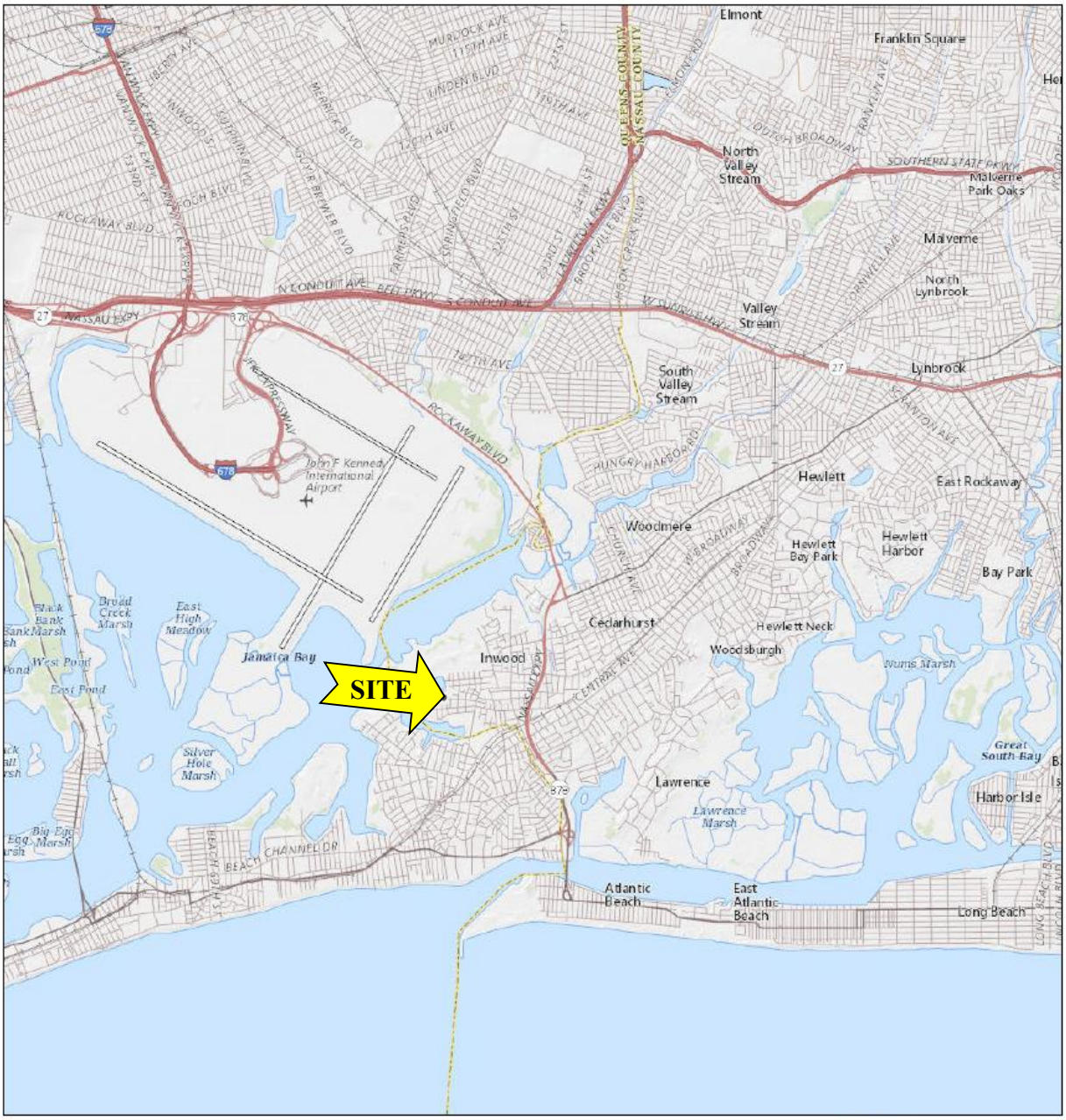
Distance: 0.45 miles
Rockaway Child Care Center
1466 Beach Channel Dr.
Far Rockaway, NY, 11691
(718) 327-1384

Distance: 0.5 miles
LB Child Day Care
2 Spaulding Ln,
Inwood, NY 11096
(516) 220-4269

Distance: 0.85 miles
Lawrence Early Childhood Center at #4 School
Mrs. Pamela Renneisen
87 Wanser Avenue
Inwood, NY 11096

7. **The location of a document repository for the project (e.g, local library) (Attachment**

Peninsula Public Library
280 Central Avenue
Lawrence, NY 11559



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0 1 2 4 km

Quadrant 7.5 Minute Topographic Map, published by the USGS, and obtained from National Map Viewer ©2018

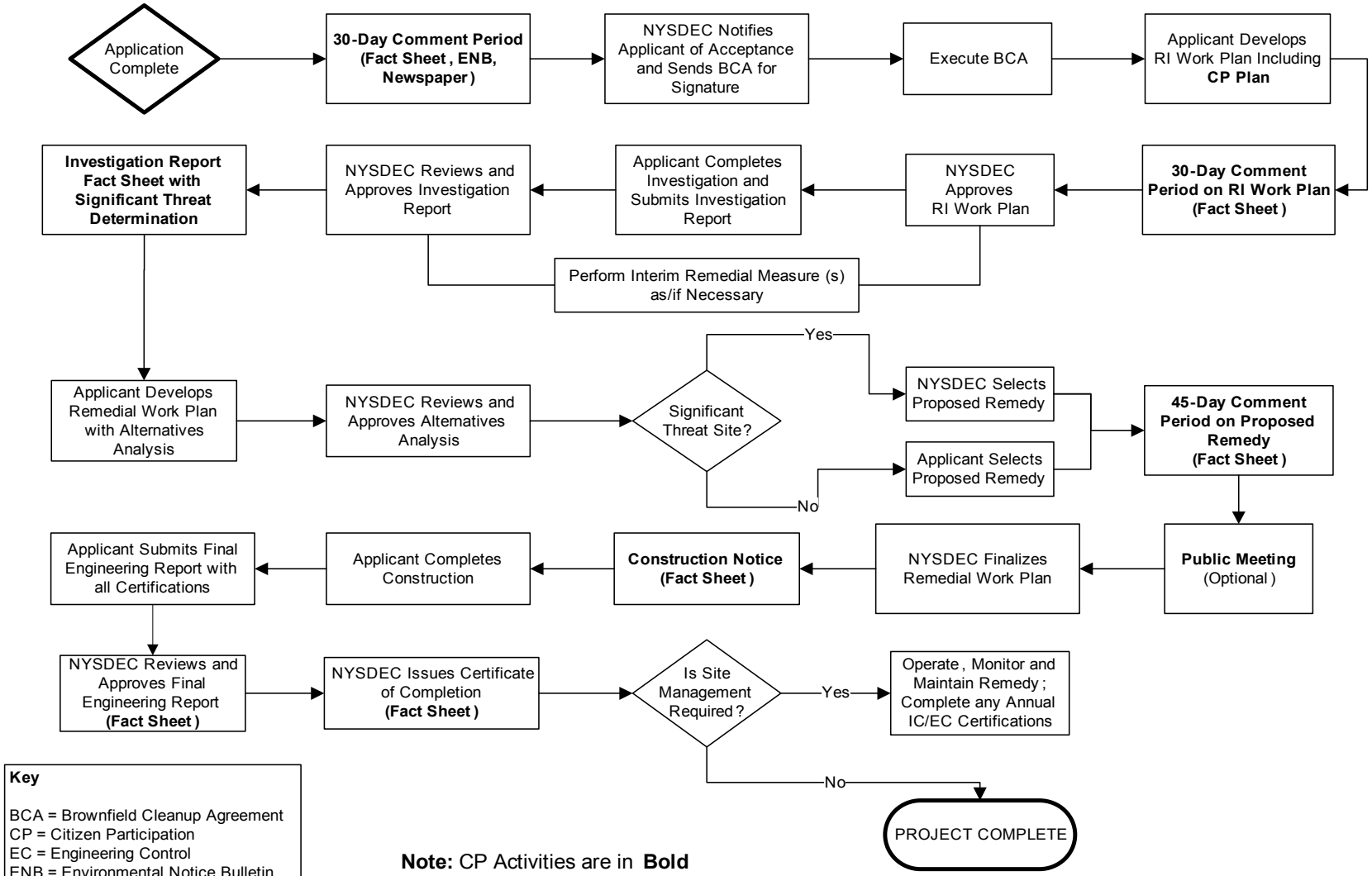
Fleming Lee Shue

SITE LOCATION MAP

SITE: 175 Roger Ave
Inwood, NY, 11096

CLIENT: Inwood 175, LLC & AJM Capital II, LLC

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 175 Roger Avenue Commercial Development

Site Number: C130164

Site Address and County: 175 Roger Avenue, Inwood, Nassau County,

Remedial Party(ies): Inwood 175, LLC & AJM Capital II, LLC

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**

None.

How were these issues and/or information needs identified?

Not applicable.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.

None.

How were these information needs identified?

Not applicable.

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.

None.

How were these issues and/or information needs identified?

Not applicable.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:

☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☐ **High** ☒ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☐ **Yes** ☒ **No**

h. Special considerations:
☐ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
Click here to enter text.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☐ **Local Officials:** Click here to enter text.

☐ **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☐ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☐ **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Ben Hess **Date:** 7/22/2019

Reviewed/Approved By: Click here to enter text. **Date:** Click here to enter text.

APPENDIX D

Soil Management Plan

175 Roger Avenue Commercial Development
Brownfield Cleanup Program
Site No. C130164

Section 40; Block L; Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

Soil Management Plan

Prepared For
Inwood 175, LLC & AJM Capital II, LLC
Great Neck, New York 11023

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

Fleming Engineering

April 2021

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1.0 Introduction

This Soil Management Plan (SoMP) has been prepared for the property (Site) located at 175 Roger Avenue, Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York. The Site has been admitted into the New York State Department of Environmental Conservation Brownfield Cleanup Program (BCP) and is referenced as Site No. C130164. The Volunteer Applicant Inwood 175, LLC (Volunteer) is contract vendee to acquire the Site. The tract occupies 3.5537 acres and is generally level. It is located in an area designated as an En-Zone.

The Site consists of eight irregular-shaped tax lots that occupy 3.5537 acres (Section 40; Block L; Lots 5, 55, 56, 57, 59, 117, 2579, and 2585 on the Nassau County Land & Tax Map). Roger Avenue borders the Site on the north, Gates Avenue fronts the east, residential buildings and Bayview Avenue lie to the south, and a warehouse owned by Expeditors (a logistics company) borders the Site on the west.

The Site is currently vacant. The concrete building floor slab of the former building occupies approximately one-third of the Site. The balance of the Site is covered with asphalt except for two small areas of broken asphalt and small areas of exposed soil in the northeast corner and south-central portion of the Site. The Site topography is flat. The average Site elevation is approximately 8.5 feet North American Vertical Datum 1988 (NAVD88). Site elevation ranges from 7 feet to 9 feet NAVD88.

Historically, the Site was developed with a 155,000 square foot, one-story warehouse building and a 2-story warehouse and office, which were constructed in several stages from 1954 to approximately 1967. The Site operated as a "Sheet Metal Fabrication" factory since at least 1961. Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste improperly stored and disposed of on-Site. In June 1992, the United States Environmental Protection Agency (EPA) conducted a Site inspection and discovered approximately (240) 55-gallon deteriorated and/or leaking drums, a 5,000-gallon tanker trailer, underground storage tanks (USTs), and observed dry wells containing sludge materials. In order to address the hazardous condition, the EPA conducted an Emergency Removal Action beginning in August 1993. The drums, tanker trailer, one (1) 1,000-gallon heating oil UST, and UST piping were removed. The Site was then used largely as a warehouse by various tenants from 1990 to 2004 including an auto repair shop (Gunter Auto Shop) and Long Island Party Rentals. The Site was acquired by Nassau County in 1995 and has remained vacant since approximately 2004. The warehouse building was damaged in a fire in February 2011, which ultimately contributed to the rationale for Nassau County to demolish the buildings in 2019.

The Site is zoned Y Industrial by the Town of Hempstead and the Volunteer contemplates developing the property as a warehouse and logistics facility. The planned development will consist of a one to two-story warehouse with ancillary office space and truck bays, parking areas, and outside storage for trailers. As such, the remedy must bring the Site into compliance such that the cleanup meets, at a minimum, the 6NYCRR Part 375 Commercial Use Soil Cleanup Objectives (CUSCOs). The Volunteer proposes to implement a Track 4 Restricted Residential remedy, removing all soils that exceed the 6NYCRR Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs). In the event this cannot be achieved, the fallback will be a Track 4 Commercial Use remedy.

The immediately adjoining properties are a mix of commercial and residential uses. Roger Avenue borders the Site to the north and a parking lot and former Eastern Shell terminal is located further to the northwest. A gravel/soil recycling facility and a Sony Pictures Entertainment building is located northeast of the Site. The Site is bordered by Gates Avenue to the east and D. Daniels Sanitation and MGR Equipment Corporation are located further east across Gates Avenue. Adjoining the Site to the south are several residential properties and adjoining the Site immediately west is a warehouse owned by Expeditors.

Site soils generally follow a trend of normal to reverse grading with depth, meaning that from the ground surface to approximately 11 to 15 feet below grade, sediments gradually become coarser. From 11 to 15 feet below grade to 35 feet below grade, sediments gradually become finer. This change in grading occurs around 11 to 15 feet below grade. This grading is characterized by surface soils consisting of non-plastic, medium to fine sands that range from 5 to 10 feet thick (0 - 15 ft.), underlain by non-plastic, sub-rounded to rounded, pebble-sized gravels that range from 1 to 4 feet in thickness (11 - 16 ft.). These gravels occur in medium to coarse sand matrices. Below this layer of gravel, the soil texture changes to fine sands and silty/clayey sands with depth. Some finer and more plastic, silt and clay-rich lenses occur variably across the Site, generally occurring above or below gravels and around 25 to 30 ft. below grade.

Directionally, from north to south, clay and silt lenses alternate from north to south, from approximately 11 to 15 ft. and from 25 to 34 ft. These lenses show no continuity between borings, alluding to these lenses trending laterally in an east-west direction. From west to east, soil trends appear to be finer on the western side of the Site toward Jamaica Bay, with thicker clay and silty clay layers occurring from approximately 12 to 16 ft. and from 24 to 30 ft. The western side of the Site contains less gravel as well, with only a thin sheet of gravel (0.25 feet thick). Conversely the eastern side of the Site consists of coarser grained sediment layers with thicker bands of gravels.

1.1 Purpose

The purpose of the SoMP is to present the methods, procedures, and guidance for handling all aspects of soil connected with Brownfield Site remediation. The SoMP specifies the means and methods for dealing with soil and provides overall soil management goals.

1.2 Goals

The goals of the SoMP are to handle all contaminated soil and manage activities associated with soil in a manner that prevents contamination from reaching the community, workers, future occupants and workers, and the environment. Contaminated soil must be kept from escaping from Brownfield Site, and all soil must be managed in a manner that ensures removal, transport, and disposal such that it fulfills applicable regulatory requirements. Another goal is to keep objectionable odors from reaching the community. At the conclusion of remediation the Brownfield Site must be secured and stable and left in a condition ready for construction.

2.0 Brownfield Remedy

Excavation is the means of removing contamination. The preferred method is to excavate soil and place it on a lined, hardened surface to promote drainage and then load directly into trucks for disposal at off-Brownfield Site facilities.

Contaminated Concrete and Debris

Contaminated concrete, wood, or other material are not anticipated. If found, these materials may have to be segregated from soil and disposed separately.

Non-Contaminated Concrete and Debris

This is concrete and asphalt or other material free of petroleum and/or chemical staining and odors. This material may be disposed as construction and demolition (C&D) and separated from contaminated soils.

3.0 Soil Management

This section describes the procedures for managing soil on the Brownfield Site.

3.1 Pre-Characterization

Where soil will be excavated and directly loaded into trucks or is otherwise slated for disposal, it must first be pre-characterized and accepted by the disposal facility(ies). To provide disposal facilities with characterization data prior to excavation, or disposal in the

event of soil staging, to allow direct load out, a sampling and analysis plan for soil pre-characterization plan prepared by an independent soil agent will be implemented. The sampling plan will specify soil sample collection procedures that comply with the requirements of licensed disposal facilities. Based on previous sampling results, it is expected that all soil will be disposed as non-hazardous material.

In general, the pre-characterization sampling and analysis plan specifies that the area be divided into sampling grids and that the individual grid cells be sampled using test pits, or borings. Each grid cell is then sampled in accordance with the frequency required by the disposal facility(ies). The discrete sub samples are collected so as to be representative of the soils in each grid cell within the vertical zone of interest. Pre-characterization sampling, because it covers a range of potential disposal facilities in several states, may include full TAGM and Part 375 analyses, full New Jersey residential analyses, ignitability, reactivity, full Toxicity Characteristic Leachate Procedure (TCLP), paint filter, pH, corrosivity, moisture, and total sulfur. Contaminated concrete and debris will also be sampled according to the requirements established by the independent soil agent.

3.2 Brownfield Site Preparation

The Brownfield Site will first be prepared for remediation and soil management. Decontamination pad(s) will be built at the truck exit location(s) and will consist of a gravel pad sufficiently large to accommodate the largest truck and with enough space to allow workers to clean the vehicles before leaving the Brownfield Site. The pad will have the means to collect wash water. Cleaning will take the form of brushing off gross soil followed by spraying with potable water to remove dust or soil residue on both the truck body and undercarriage. The rinse water will be disposed in off-Site disposal facilities.

Protective fencing and/or barriers will be installed along the Brownfield Site perimeter to protect the public from Brownfield Site work and to control vehicle movement. The barriers will comply with Nassau County Code. Internal barriers for Brownfield Site control and traffic management may also be added as necessary.

3.3 Soil Stockpiling

Soil stockpiling areas will be prepared by selecting locations that are sufficiently large to hold soil the volume of excavated soil. There should be enough area to accommodate the soil to be staged and to accommodate segregating soil into different types of piles. Since disposal options and costs differ appreciably depending on the type of soil contaminant, pending the results of pre-characterization sampling, enough space must be available to segregate soils into separate piles as the disposal facility(ies) require, where feasible and if space permits.

The stockpile area must be such that storm water cannot transport contaminated soil off the Brownfield. Storm water control may be accomplished by either encircling the piles with hay bales and silt fencing or equivalent, directing run-off to a point where it can be

collected and disposed. All soil piles must be covered by plastic sheeting when inactive and the sheeting weighed down to prevent uncovering.

Some soil will be excavated from below the water table. In this case, the preferred approach is to allow the soil to drain on lined, hardened Surfaces where then drainage water can be collected. If this is not possible, then an inert material such as ground corn cobs or kiln dust to absorb excess water may be used.

3.4 Soil Segregation

Soil will be segregated on the basis of the pre-characterization results, prior soil sampling results, Brownfield Site knowledge, and direct observations during excavation. Direct observations include visual observations of staining and sheen, odors, and photoionization detector (PID) readings. Segregation decisions will be made by an on-Brownfield Site qualified environmental professional with Brownfield Site knowledge representing the Volunteer. Where soil contains different types of contamination, the more conservative disposal option will be selected (e.g., historic fill with petroleum contamination will be treated as petroleum contaminated; or as the selected disposal facility(ies) require. The environmental professional will direct the contractor to place soil in the various pre-determined stockpiling areas or directly onto the proper trucks.

Segregated soils may require additional soil characterization sampling. Material slated for disposal will follow the requirements of the pre-characterization sampling protocol, modified as necessary for the volume, disposal facility, and previous results.

3.5 Soil Loading, Transport, and Documentation

All trucks used for disposal will be permitted as licensed waste transporters as required by NYCRR Part 364. Trucks will be covered with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). Petroleum or solvent-contaminated soils will be transported in trucks with gasketed rear gates to prevent any liquid discharge during transit.

A decontamination pad will be placed at the exit. Before exiting, soil will be brushed or washed off the trucks' exterior and undercarriage and the wash water collected and disposed at an approved facility.

Details of truck movement and staging will not be complete until a contractor is selected. These will be presented to NYSDEC once they become known. Truck transport routes will be provided to the Department for approval, if requested.

Disposal Facilities and Submittals

Disposal facilities will be identified for each anticipated waste stream. All required analytical data will be provided to the disposal facilities for approval. Primary and alternate disposal facilities will be designated and submitted for each anticipated waste stream.

Primary facilities will be contracted, upon final approval from the Volunteer, prior to excavation. Copies of contracts from each facility or letters from each facility indicating acceptance of the total estimated volume of material from this project will be submitted to the Department. Additionally, copies of all waste manifests, bills of lading, and certified weight slips from a scale approved for the use of all disposed materials as well as the Part 364 Permits for all waste transporters will be submitted to the Department.

Vehicle Requirements and Odor Suppressant

All license plates on the trucks will be properly affixed and visible at all times; proper placards will be displayed and extraneous or incorrect placards will be covered and/or removed prior to the truck departing the Site. All required permits will be properly displayed or readily available for verification by the Department. Drivers will remain in the truck at all times unless they are wearing the correct personal protective equipment required for the Site. Standing on the back of the truck will be prohibited and ladders or scaffolding will be used when securing tarps and/or covers. Vehicles and containers used to store and/or transport materials will be provided with solid and/or tight fitting sealable or otherwise appropriate covers to minimize the release of odors during transport (no mesh covers will be used). The Department has the right to reject vehicles that are not properly equipped and/or arrive to the Site in a dirty condition. Odor and dust suppressing foam will be available as needed to supplement covers, or if requested by the Department.

Execution

Traffic control at the Site entry will ensure a smooth flow of traffic and minimize congestion at the Site entrance. At a minimum, the traffic control will include the usage of flaggers and proper signage, where required. Trucks containing excavated material will be properly covered prior to exiting the Site to prevent vapor and fugitive dust emissions during transport. The covers will be supplemented with odor suppressant foam or solvent as needed. Gross vehicle truck weights shall conform to the most current DOT regulations for the Federal, State, and local level. All work in and around trucks will be performed in appropriate personal protective equipment in conformance with the Site Specific HASP.

Prior to leaving the Site, material transport vehicles and containers will be inspected for evidence of contamination (including inside of wheels and undercarriage). All trucks leaving the Site will proceed to a decontamination station for cleaning prior to exiting onto public roads. Trucks and equipment will be cleaned using a broom and/or brushes within the excavation area prior to moving to the decontamination pads to decrease the amount of particulates leaving the remediation area. If necessary, at the decontamination pad, all heavy equipment will be pressure washed before leaving the Site. All equipment leaving the Site will be decontaminated as per these guidelines. In addition, any equipment previously utilized to excavate impacted material will be decontaminated prior to use in backfilling (e.g. excavator bucket). Decontamination pads will be sized to ensure that the largest piece of contractor equipment can be adequately decontaminated and provisions will be made to control overspray at the decontamination pads. All wastewater from decontamination will be collected and contained for off-Site disposal. Wastewater will be transported from the Site by a properly licensed liquid waste. Soils collected from the

decontamination pads will be bulked with the impacted material and sent to the properly licensed approved disposal facility, as necessary.

Trucks will proceed directly to the designated disposal facility after leaving the Site and will not be pre-loaded with material for overnight storage. Cleanup of any material spilled or leaked in transit, or mud or dirt tracked off-Site will be performed in accordance with all applicable Federal, State, and local regulations. Material from the Site will not be combined with any other material.

Volunteer and/or Volunteer's agent will sign transport bills of lading or manifests. Volunteer will provide a hazardous waste generator number, if required. Maintain copies of all documents involving transportation of materials from the Site. Copies of these records shall be submitted to the Department at a frequency agreed to by Arnold F. Fleming, Remedial Engineer, and Volunteer. All records shall be turned over to the Volunteer at the completion of the Work. It will be ensured that all transport vehicles are properly secured, labeled, and placarded.

3.6 Excavation

Soil excavated as part of remediation will be either directly loaded into trucks or stockpiled for later loading and disposal. All stockpiles will have dust controlled by means of water mist, or equivalent, if necessary. A source of water and means of applying water spray will be available and within easy access.

At the end of each workday the excavation will be secured in a manner that controls odors. If odors become objectionable or have the potential to adversely affect the neighborhood, then odor control will be employed. Control measures may include covering the bottom or excavation sidewalls with tarps, plastic, foam, encapsulant, soil or gravel, or some combination that is effective.

3.7 Imported Backfill

Imported material brought in as backfill must be certified that it is free of contamination as virgin source material with written documentation from the supplier certifying that the soil is from a source not known to have been contaminated or have received hazardous materials, petroleum or other hydrocarbon-derived, toxic, or radioactive materials. If the material is not virgin, then the material will be tested for full Part 375 Soil Cleanup Objective parameters analyses from each source area. The tested material will be considered acceptable for reuse on the Brownfield Site if it meets the Part 375 Restricted Residential or Commercial Use criteria as set forth in NYCRR Part 375-6.7(b). Additionally, the material will be tested to ensure it meets the criteria for emerging contaminants. Alternatively, recycled concrete aggregate (RCA), a commercial product, may be used as imported backfill without testing. Sampling frequency of the material to be brought on the site will follow the guidelines set forth in DER-10, Table 5.4(e)10.

All imported soil must be free of organic material, debris, cinders, combustibles, wood, roots, and staining. All imported soils must be approved by NYSDEC before being brought to the Brownfield Site. Backfill placement on the Brownfield Site must be approved by the Brownfield Site environmental professional.

4.0 Demobilization

The Brownfield Site must be stabilized and secured at the conclusion of remediation. This means removing all equipment and materials used for remediation and ensuring that all former soil staging areas and cleaning apparatus have been decommissioned and cleaned and that no contaminated soil or debris remains on Brownfield Site.

APPENDIX E

Health & Safety Plan

175 Roger Avenue Commercial Development
Brownfield Cleanup Program
Site No. C130164

Section 40; Block L; Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

ENVIRONMENTAL HEALTH AND SAFETY PLAN

Prepared For
AJM Capital, LLC
New York, New York 10111

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

Fleming Engineering

SEPTEMBER 2020

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1.0 INTRODUCTION

Fleming Engineering (FE) prepared this Health and Safety Plan (HASP) on behalf of AJM Capital, LLC, for use by FE employees during environmental investigation activities at the 175 Roger Avenue Site (hereafter referred to as the "Site"), Inwood, Nassau County NY.

The Site is located at 175 Roger Avenue, Inwood, Town of Hempstead, Nassau County, New York. It consists of Tax Block L, Lots 5, 55, 56, 57, 59, 117, 2579, and 2585 and is bounded by Roger Avenue to the north, Gates Avenue to the east, residential buildings to the south and a freight service to the west. The Site was developed with a 155,000 square foot, one-story, warehouse building and a 2-story warehouse and office, which were constructed in several stages from 1954 to approximately 1967. The Site operated as a "Sheet Metal Fabrication" factory beginning circa 1961. Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste material improperly stored and disposed of on-Site. The primary contaminants of concern at the Site include petroleum hydrocarbons, chlorinated volatile organic compound (VOCs), semi-volatile organic compounds (SVOCs) and metals. The impacted media include soil, soil vapor and groundwater.

The purpose of this HASP is to identify the real and potential hazards associated with the planned environmental field activities and to stipulate appropriate health and safety procedures, particularly where hazardous materials are potentially present. The procedures and guidelines contained in this document are intended to minimize exposure to chemical, physical and biological hazards that may be present in the soil, groundwater, or air, and to reduce the potential for accidents and injuries.

The procedures described in this document were developed in accordance with the provisions of Occupational Safety and Health Administration (OSHA) rule 29 CFR 1910.120 and FE' experience with similar projects. All Site workers must review this HASP before entering the Site. The Health and Safety Officer (HSO) or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask Health and Safety questions during attendance at a pre-field safety meeting. Field personnel will sign the acknowledgment form (Appendix A) maintained on-Site during the investigation. The recommended Health and Safety guidelines in this document may be modified, if warranted, by additional information obtained prior to, or during Site investigation. The HSO will also maintain copies of pertinent health and safety records for all field personnel.

The Occupational Safety and Health Act (1970) requires:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.

- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Act, that are applicable to company business and operations.

- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.

- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

1.1 Site History

The Site was developed with a 155,000 square foot, one-story, warehouse building and a 2-story warehouse and office, which were constructed in several stages from 1954 to approximately 1967. The Site operated as a "Sheet Metal Fabrication" factory since at least 1961. Next, Rockaway Metal Products occupied the Site from approximately 1971 to 1987, when they abandoned the Site and reportedly left hazardous waste material improperly stored and disposed of on-Site.

In June 1992, the United States Environmental Protection Agency (EPA) conducted a site inspection and discovered approximately 240 55-gallon deteriorated and/or leaking drums, a 5,000 -gallon tanker trailer, underground storage tanks (USTs), and observed dry wells containing sludge materials. In order to address the hazardous condition, the EPA conducted an Emergency Removal Action beginning in August 1993. The drums, tanker trailer, one (1) 1,000-gallon heating oil UST, and UST piping was removed. The Site was then used largely as a warehouse by various tenants from 1990 to 2004 including an auto repair shop (Gunter Auto Shop) and Long Island Party Rentals. The site was acquired by Nassau County Department of Real Estate in 1995 due to nonpayment of taxes and has remained vacant since approximately 2004. The warehouse building on Site was damaged in a fire in February 2011 and was subsequently condemned. In October 2018, Nassau County, in concurrence with the NYSDEC began demolition of the buildings on Site, which concluded in March 2019.

1.2 Previous Site Investigations

The following Site investigations have been undertaken on the property:

March 2005, *Phase I Environmental Site Assessment* by ATC Associates Inc.
June 2005, *Site Investigation Report* by ATC Associates Inc.
April 2007, *NYSDEC BCP Remedial Investigation Work Plan* by ATC Associates Inc.
June, 2009 *NYSDEC BCP Remedial Investigation Report* by ATC Associate Inc.
November 2018, *Phase I Environmental Site Assessment* by Fleming-Lee Shue Inc.
August 2020, Supplemental Remedial Investigation (SRI) conducted by Fleming Engineering

These investigations identified the following conditions at the Site.

Historic Operations On-Site— According to the historic Sanborn Maps, city directories, and environmental database review the Site operated as a Sheet Metal Fabrication plant starting in 1961 and Far Rockaway Metal Products from 1971 to 1987. Historic use of the site in these

operations could have impacted the quality of the Site including soil, groundwater, and soil vapor and is therefore considered a Recognized Environmental Concern (REC).

Improper Storage of Hazardous Material On-Site— According to the environmental database review, in 1987 Rockaway Metal Products abandoned the Site and reportedly left hazardous waste materials improperly stored and disposed of on-Site. In June 1992, the United States Environmental Protection Agency (USEPA) conducted a site inspection and discovered 240 55-gallon deteriorated and leaking drums, a 5,000-gallon tanker trailer in poor condition, dry wells that appeared to contain sludge material and USTs that contained potentially flammable liquids. The drums, tanker trailer, and one 1,000-gallon UST located in the southeast portion of the Site was removed. The improper storage of this hazardous waste could have exposed the subsurface to contaminants including petroleum hydrocarbons, chlorinated volatile organic compounds, semi-volatile organic compounds (SVOCs), and metals. These contaminants could have adversely impacted the quality of the Site including soil, groundwater and soil vapor and therefore are considered a REC.

Potential Hazardous Waste On-Site— During Site Reconnaissance, FE observed FE observed garbage and debris was ubiquitous throughout the Site and heavily concentrated along property boundaries indicating the Site was likely used for illegal dumping. FE observed stockpiles of 100+ used tires, broken asphalt, general refuse, debris, and six (6) 55-gallon drums throughout the Site. The contents and integrity of on-Site drums could not be determined as FE could not access the Site during on-going demolition operations. Without closer examination FE cannot rule out contamination from these sources impacting the quality of the Site and therefore they are considered RECs.

Historical Underground Storage Tanks (USTs) On-Site—According to the environmental database review the Site has contained a number USTs on Site, which varies depending on source. Collectively, there appears to have been upwards of seven (7) USTs on Site historically and potentially four (4) currently abandoned on-Site. According to the database review, contents of the tanks reportedly included fuel oil, gasoline, xylene and naphthalene. Site Investigation conducted by ACT Associates Inc. in May 2005 included an electromagnetic ground penetrating radar (EM/GPR) survey that revealed five (5) underground anomalies thought to be USTs. The Site itself is located in an area of shallow groundwater and salt water intrusions induced by tidal fluctuations beneath the Site could potentially accelerate the corrosion of the USTs. The presence of USTs on-Site with a history of leaking could have adversely impacted the quality of the Site including soil, groundwater, and soil vapor and therefore is considered a REC.

1.3 Summary of Site Conditions

The most recent SRI found soils to be minimally impacted. Nearly all soil impacts were from metals (arsenic, cadmium, lead, mercury, chromium, copper, zinc) in the dry wells on the western portion of the property.

Soil vapor impacts were low across the Site and were elevated for Tetrachloroethene (PCE) and Trichloroethene (TCE) in a few location nears the eastern part of the Site.

Groundwater was the most impacted medium and was impacted by PCE, TCE, and xylenes primarily in the UST Area in the northeast corner of the Site, although PCE and TCE appear in groundwater through the Site.

The highest concentration of PCE and TCE occur in the 30 to 35-foot interval in the UST Area where concentrations reached a maximum of 7,610 µg/L of PCE and a maximum of 5,440 µg/L of TCE. Xylene concentrations were greater in shallow depths reaching a maximum concentration of 45,700 µg/L in the 10 to 15-foot interval.

2.0 TASKS TO BE PERFORMED UNDER THIS PLAN

The tasks to be performed under this plan include:

- Soil Excavation
- Concrete pad demolition and removal
- Collection of endpoint soil samples and waste classification samples
- Installation of temporary and permanent monitoring wells
- Loading soils onto trucks
- Installing clean backfill
- Soil vapor monitoring

3.0 POTENTIAL CHEMICAL, PHYSICAL, AND BIOLOGICAL HAZARDS AND CONTROLS

This section discusses the potential chemical, physical, and biological hazards and controls associated with the investigation tasks above. A summary of potential site safety hazards and safety requirements is presented in Table 1.

3.1 Potential Chemical Hazards/Controls

Based on the previous investigations conducted at the site, this HASP focuses on the following potential chemicals of concern:

- VOCs
    - Benzene
    - Toluene
    - Ethylbenzene
    - Xylenes
    - Trichloroethylene
    - Tetrachloroethylene
    - cis 1,2 dichloroethylene
    - Acetone
    - Methyl Ethyl Ketone (MEK)
    - Arsenic
    - Lead
    - Cadmium
    - Chromium
    - Mercury
    - Copper
    - Zinc

- Other
    - Dust from fill and concrete removal

Appendix B lists the recognized and suspected health hazards, exposure limits, physical and chemical properties, recommended protection levels and symptoms of exposure for the chemicals known or suspected to be present at the site. The chemical hazards will be minimized by limiting exposure of personnel to soil and groundwater and by the use of personnel protective equipment (PPE).

3.2 Physical Hazards/Controls

Physical hazards potentially present at the site include, but are not limited to, the following:

Hazard	Control
Slip, trip and fall (uneven terrain and slippery surfaces)	Avoid Uneven Terrain, Walk Slowly, Wear Sturdy/Supportive Shoes
Environmental (heat/cold) stress;	A discussion of heat stress and cold stress and related illnesses and controls is provided in Appendix C.
Vehicular Traffic	Avoid working in high traffic areas. If necessary, use cones, reflective vests, and consider use of a flagman/additional protection.
Fire	Ensure class ABC fire extinguisher is nearby to work area when using equipment that can provide an ignition source (heavy machinery, generators, power tools)
Noise hazards	Use ear plugs and/or ear muffs during demolition and excavation activities.
Use of heavy equipment	Stay clear of heavy equipment during operation. Maintain eye contact with operator when approaching equipment.
Flying Debris	Safety glasses and hard hats will be used during all demolition and excavation activities.
Noise	Hearing protection will be used during all demolition and excavation activities.
Dust	Appropriate face and or dust masks will be used during all demolition and excavation activities.

Anticipated site operations do not include the need for specific operations such as, lockout/tag-out, scaffolds or confined spaces; therefore these items are not addressed in this HASP. If site activities require these operations, the HASP will be amended and properly trained, experienced and competent personnel shall be utilized.

3.3 Biological Hazards/Controls

The work is scheduled to be completed during summer and is located outdoors, however the following hazards may or may not be present at the site.

Hazard	Control
Bites or stings from insects/animals (particularly ticks) resulting in skin inflammation, disease, or allergic response	Keep exposed skin covered. Use insect repellant if necessary. Inspect yourself carefully after work is completed.
Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma	Keep exposed skin covered using proper PPE. Wash hands regularly.
Skin irritation from poison ivy, oak, sumac	Keep exposed skin covered using proper PPE. Wash hands regularly.
COVID-19	Keep exposed skin covered using proper PPE. Wash hands regularly. Social distancing. Wearing mask and gloves.

3.4 Levels of Personal Protection

Personal protective equipment (PPE) must be worn as required for each job in all operations where there is an exposure to hazardous conditions. Upon review of contaminant levels, physical and biological hazards, exposure routes and the nature of the field tasks, it has been determined that the Level D protection will be used during field activities.

In the event that caustic or high pH soils or groundwater are encountered during remediation activities the level of protection may need to be upgraded from Level D to Modified Level D. Modified Level D protection serves as increased dermal protection when there is not an increased in need respiratory protection.

Photoionization detector (PID) readings above 5 ppm require caution. A sustained PID measurement greater than 5 ppm above the background level or objectionable nuisance odors, detected over a 15-minute period in the breathing zone, will require upgrading respiratory protection to Level C.

If a sustained PID measurement reach 30 ppm above the background level or higher in the worker breathing zone, and 5 ppm or higher at the perimeter (20 feet from where the work is being done), it is recommended to stop the work and resume work only after the PID measurements drop below 30 ppm in the worker breathing zone.

Instrument	Action Level	Response Action
PID	< 5 ppm over background level	Level D
	≥ 5 and ≤ 30 pm over background level	Upgrade to Level C, notify HSO immediately, initiate perimeter monitoring
	> 30 ppm over backgroung level in worker breathing zone, or > 5 ppm over background at perimeter	Stop work, resume work after levels drop below 30 ppm in worker breathing zone

Lists of the protection equipment for Levels D and C are summarized below:

3.4.1 Level D

Level D applies to work in areas where the possibility of contact with potentially contaminated groundwater and soil exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls;
- Safety boots, with steel toe;
- Safety glasses;
- Reflective vest;
- Hard hat;
- Disposable latex gloves;
- Hearing protection, to be used as needed; and
- HEPA Dust Mask for Nuisance Dust as needed.

3.4.2 Modified Level D

Modified Level D applies to work in areas where the possibility of contact with potentially contaminated groundwater and soil is probable or certain and a greater level of protective equipment is warranted. The protective equipment required for Level D includes, but is not limited to, the following:

- Protective clothing and other equipment required for Level D;
- Tyvek coverall;
- Rubber Overboots or boot covers;
- Heavy Duty Rubber or Chemical Resistant Gloves; and
- Safety Goggles or Splash Shield.

3.4.3 Level C

Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D;
- Full-face air purifying respirator (APR) with high efficiency particulate/organic vapor cartridges (ultra-twin with GMCH cartridges);
- Saranex-coated disposable coveralls with hoods ;and
- Boot covers.

3.5 General Hazard Controls

3.5.1 General Workplace Safety Rules

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor. Defective equipment will be taken out of service immediately and repaired or destroyed.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions.
- Crossing highways and major roadways is not recommended. Expect movement of cars and buses at any time along any roadway, regardless of traffic signals, stop signs, yield signs, etc.
- When walking on right-of-way or road-shoulders, keep a sharp lookout in both directions.
- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.

- Whenever possible, objects will be lifted and moved by mechanical devices (cranes, manually operated chain hoists, fork trucks, etc.) rather than by manual effort.
- The mechanical devices will be appropriate for the lifting or moving task and will be operated only by trained and authorized personnel.
- Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects.
- Personnel will not pass under a raised load, nor will a suspended load be left unattended.
- Operations near overhead power lines are prohibited unless the power source has been shut off and locked out/tagged out or the appropriate clearance distances are maintained.
- Hand and power tools will be maintained in a safe condition to protect both the worker and the public from injury.
- Follow OSHA's vehicle management requirements, designed to ensure that vehicles are maintained and operated in a safe condition to protect workers and the public.
- A dry chemical fire extinguisher and hose with potable water should be available when excavating and handling soils.

3.5.2 Housekeeping

- Proper housekeeping is the foundation for a safe work environment. It definitely helps prevent accidents and fires, as well as creating a professional appearance in the work area.
- Material will be piled or stored in a stable manner so that it will not be subject to falling.
- Combustible scrap, debris, and garbage shall be removed from the work area at frequent and regular intervals.
- Stairways, walkways, exit doors, in front of electrical panels, or access to fire-fighting equipment will be kept clear of materials, supplies, trash, and debris.

3.5.3 Fire Prevention

- All firefighting equipment shall be conspicuously located, accessible, and inspected periodically, and maintained in operating condition. An annual service check and monthly visual inspections are required for fire extinguisher.
- All employees must know the location of fire-fighting equipment in the work area and have knowledge of its use and application.

3.5.4 Industrial Hygiene and Occupational Health

- Toilet facilities shall be provided as required for the number of workers.
- A first aid kit and portable eyewash station shall be kept on site.
- An adequate supply of potable water shall be provided.
- The use of a common drinking cup is prohibited.
- Employees must be protected against exposure to hazardous noise levels by controlling exposure or by use of proper PPE.
- Any FE Activities will be assessed for lead exposure (particularly if drywall or any painted surfaces or abrasive blasting/grinding is involved) and/or asbestos exposure.

3.5.5 Personal Hygiene

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol or other non-prescription drugs by personnel that could impair the ability to function at the work site is prohibited. The use of some prescription drugs may impair the ability to function and can create safety problems on-site. Field personnel taking prescription medication should alert the HSO in case of an emergency. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

4.0 TRAINING, PROJECT ORGANIZATION, AND PERSONNEL

4.1 Training

Knowledge of the safety rules supplemented by compliance is essential to safety. New employees will be provided orientation training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site.

All employees will have successfully completed the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4]).

Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety-training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program.

If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics
- Respirator care/use
- Hazard communication (hazardous chemicals)
- Slip, trip and fall hazards and fall protection
- Suppression and Monitoring

Specialized training will be documented in the employees' personnel records and/or in a master training record.

4.2 Project Team Organization

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The project team organization is shown on Table 2, and the roles are described below.

Health and Safety Officer (HSO)

- Administers all aspects of the occupational health and safety program
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites

- Assists management and supervisors in the health and safety training of employees
- Conducts inspections to identify unhealthy or unsafe conditions or work practices
- Investigates all accidents and takes action to eliminate accident causes
- Monitors to determine the degree of hazard
- Determines the protection levels and equipment required to ensure the safety of personnel
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels
- Monitors performance of all personnel to ensure compliance with the required safety procedures
- Ensures that all personnel have been trained in proper site-safety procedures including the use of PPE, and have read and signed the Acknowledgment Form (Appendix A)
- Conducts daily briefings as necessary
- Halts work if necessary
- Ensures strict adherence to the Site HASP
- Reviews personnel medical monitoring participation

Project Manager

- Familiar with health and safety regulations related to area of responsibility
- Directs and coordinates health and safety activities within area of responsibility
- Ensures arrangements for prompt medical attention in case of serious injury
- Requires all employees supervised to use individual protective equipment and safety devices
- Ensures that safety equipment is available, maintained, used, and stored correctly
- Instructs and trains all persons within area of responsibility in health and safety requirements
- Conducts frequent and regular health and safety inspections of work area. Directs correction of unsafe conditions
- Conducts weekly safety briefings with all supervisors and/or workers
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations

All Employees

The minimum personal qualifications for each individual participating in field activities include:

- OSHA-specific medicals including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators
- Participation in the FE Occupational Health Monitoring Program
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4])
- Be familiar with and comply with proper health and safety practices
- Use the required safety devices and proper personal protective safety equipment
- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries. In the event of an injury a Accident and Injury Report Form will be filled out (Appendix D).

4.3 Subcontractor Compliance

All FE contracts and subcontracts require that state and federal laws concerning health and safety will be observed by the subcontractor.

5.0 INDIVIDUAL HEALTH AND SAFETY PROGRAMS LISTING

OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

5.1 Hazard Communication Program

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Required elements of the written program include a master listing of chemicals; maintaining material safety data sheets on each chemical; and training of employees on the program, the chemicals exposed to, and material safety data sheets.

5.2 Respiratory Protection Program

If employees are exposed to hazardous/toxic chemical, paint or other gases, vapors, fumes, dusts, or mists above the National Institute for Occupational Safety and Health (NIOSH) permissible exposure limit (PEL), and/or employees wear respirators, this program is required. Program elements are written program for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use. .

5.3 Occupational Noise Exposure/Hearing Conservation Program

If employees are exposed to noise levels above the permissible noise exposures, protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as a written program, noise monitoring, hearing evaluations and follow-on testing, personal protective equipment (hearing protection), and maintenance of medical records.

5.4 Emergency Response Plan

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

5.5 Asbestos Control Program

If employees are exposed to asbestos fibers in the workplace, then an initial monitoring for asbestos exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure monitoring, medical surveillance and records maintenance, engineering controls, personal protective equipment, and training.

5.6 Lead Exposure Program

If employees are exposed to lead in the workplace, then an initial monitoring for lead exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure monitoring, medical surveillance and records maintenance, engineering controls, personal protective equipment, and training.

6.0 DECONTAMINATION

6.1 Site/Work Area Organization

A typical site work area will consist of an exclusion zone where the actual field activity will take place; a decontamination zone; and a command post located outside the decontamination area and exclusion zones.

Levels of personal protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

6.2 Personnel Decontamination

Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps, if applicable:

- Soap and potable water wash and potable water rinse of gloves
- Tyvek removal
- Glove removal
- Field wash of hands and face

6.3 Equipment Decontamination

The following decontamination procedure will be implemented in the field after field equipment has come in contact with contaminated material.

- Rinse equipment in tap water
- Scrub equipment with non-phosphate detergent and tap water
- Rinse equipment with distilled water
- Allow equipment to air dry

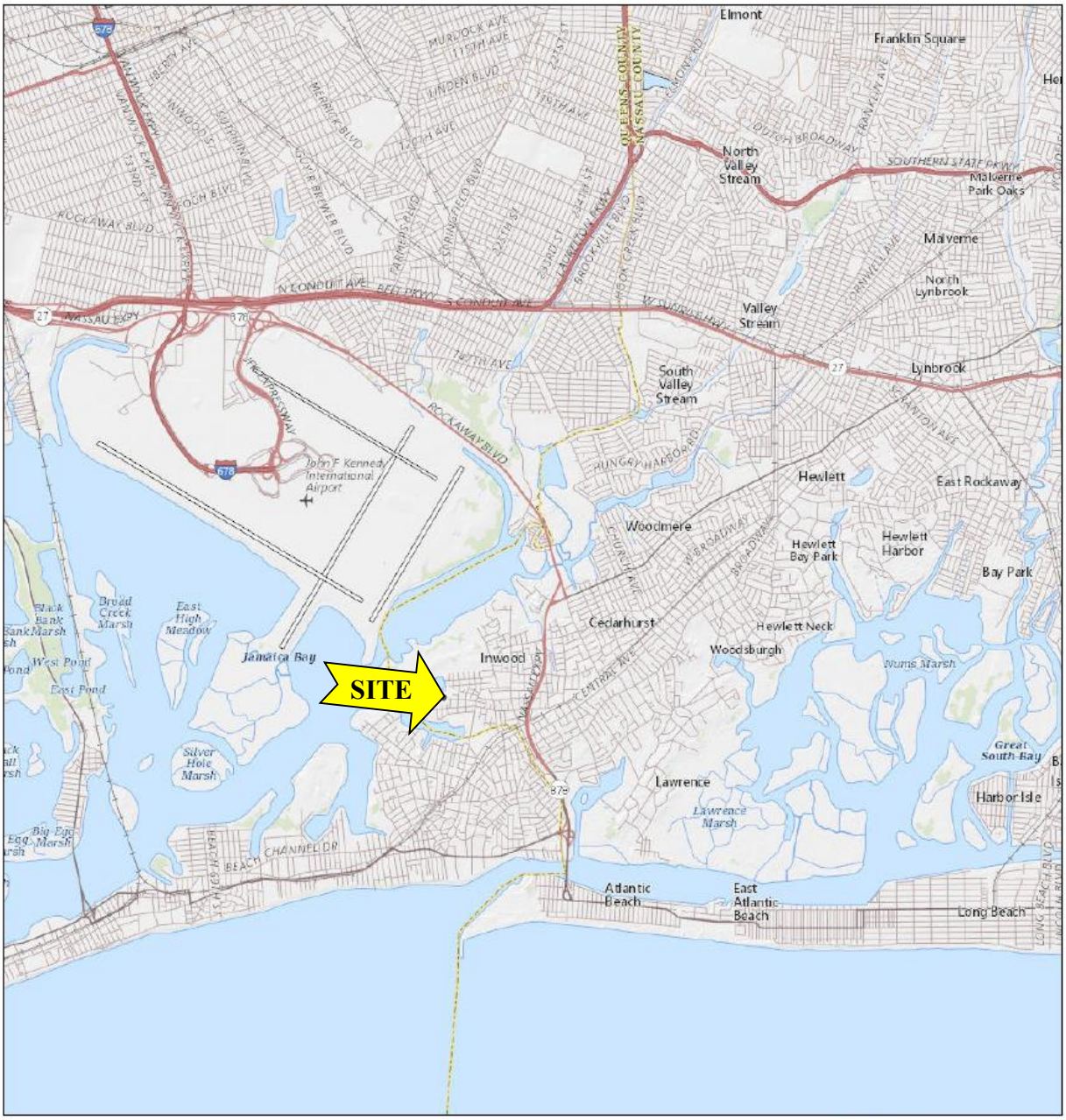
7.0 EMERGENCY AND CONTINGENCY PLAN

Emergency communications will be maintained during all on-site field activities. The emergency route to the hospital is depicted on Figure 3 and emergency contacts and their phone numbers are presented in Table 2.

A first aid kit will be available on-site at all times for any minor on-site injuries. Emergency medical assistance or ambulance can be reached by calling 911 for more severe injuries.

A site specific emergency plan will be developed in the field which will include evacuation procedures, chain of command, rally point, and emergency procedures.

FIGURES



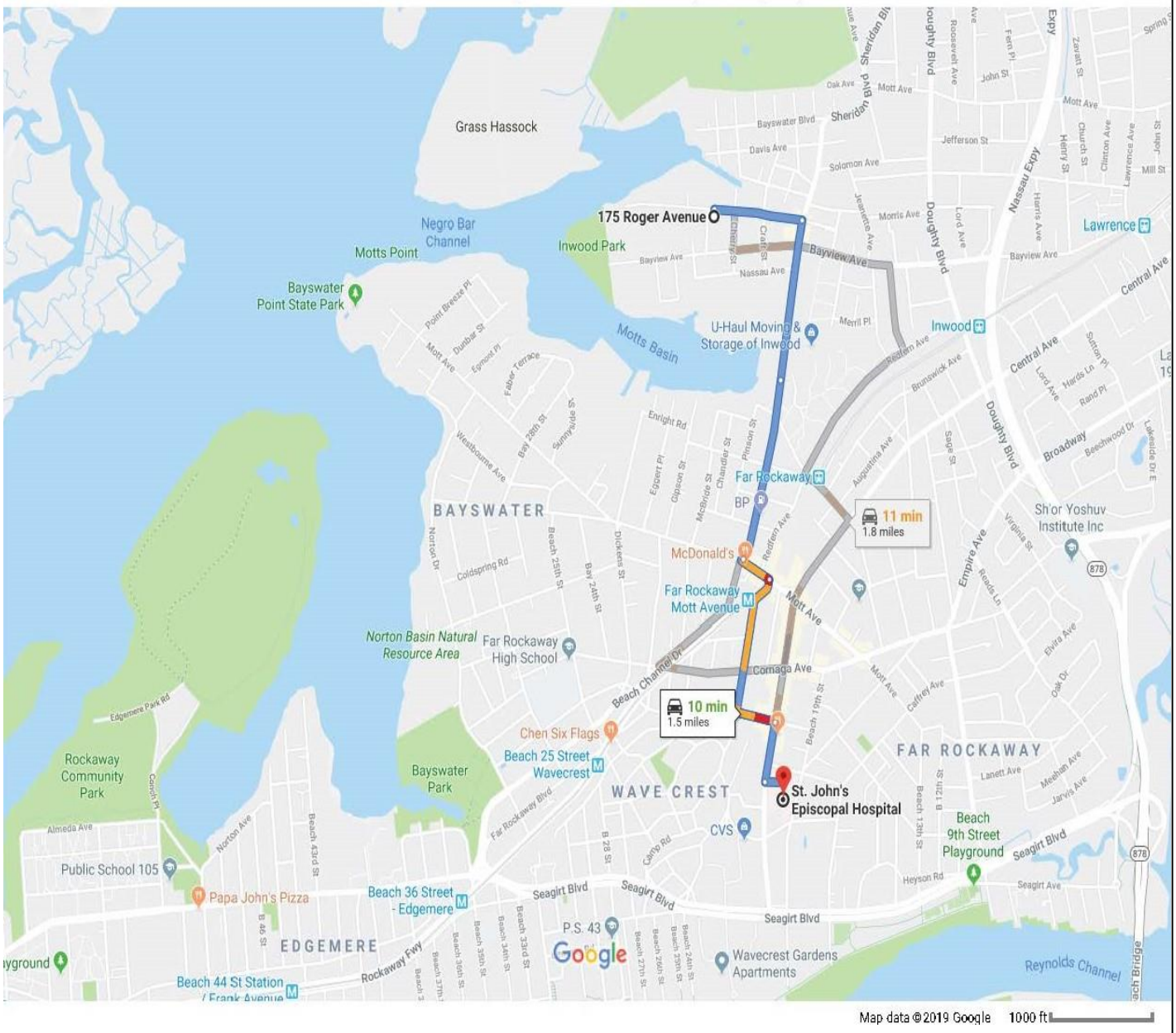
Quadrant 7.5 Minute Topographic Map, published by the USGS, and obtained from National Map Viewer ©2018

FIGURE 1: SITE LOCATION MAP

Fleming Lee Shue

SITE: 175 Rogers Ave
Inwood, NY, 11096

CLIENT: AJM Capital



Google Maps, published ©2019

FIGURE 3: HOSPITAL ROUTE

Fleming Lee Shue

SITE: 175 Roger Avenue
Inwood, Nassau County, NY

CLIENT: AJM Capital, LLC.

TABLES

HEALTH AND SAFETY PLAN

175 Roger Avenue
Inwood, Nassau County NY.

Emergency Contacts and Phone Numbers

Company	Title	Contact Number
Fleming-Lee Shue, Inc 158 West 29th Street New York, NY 10001		(212) 675-3225
Arnold Fleming	Project Director	(917) 885-1475 (cell)
Mark Hutson	Senior Project Manager	(480) 907-8207 (cell)
Steve Panter	Quality Assurance Manager	(609) 751-1395 (cell)
Joel Kane	Health and Safety Officer	(406) 321-0586 (cell)
EMERGENCY		911
HOSPITAL **St. John's Episcopal Hospital:** 327 Beach 19th St. Far Rockaway, NY 11691		(718) 869-7000 (main and emergency line)
EMERGENCY SPILL RESPONSE: New York State Department of Environmental Conservation (NYSDEC) NYSDEC Hotline Oil or Abandoned Chemicals Releases from Underground Petroleum Storage Tanks Hazardous Waste		1-800-457-7362

HEALTH AND SAFETY PLAN

175 Roger Avenue
Inwood, Nassau County, NY

Project Team Organization

Personnel	Responsibilities
Arnold Fleming, P.E.	President, FLS Project Director
Mark Hutson	Senior Project Manager
Steve Panter	Senior Project Manager Quality Assurance Manager
Joel Kane	Task Manager Health and Safety Officer
Jordan Arey	Alternative Health and Safety Officer

APPENDIX A

Acknowledgement Form

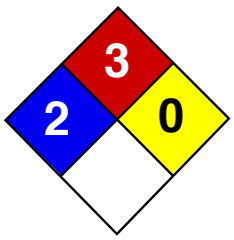
HASP ACKNOWLEDGMENT FORM

The following personnel have read the site-specific HASP and are familiar with its provisions.

Print Name	*Signature*	*Company*	*Function*	*Date*

APPENDIX B

Profiles of Chemicals of Concern
Safety Data Sheets



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

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

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

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

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

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

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

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

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

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

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

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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

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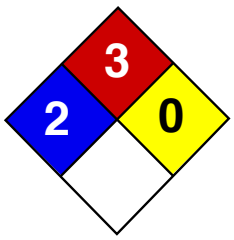

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

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

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

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

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

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

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

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

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

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

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

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

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

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

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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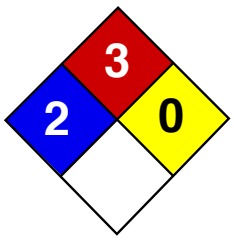

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

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

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

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

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

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

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

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

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

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

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

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

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

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., Nationial Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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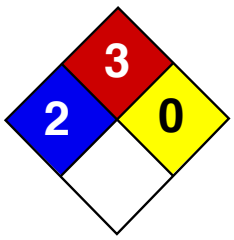

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)2

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

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

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

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

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

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

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

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

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

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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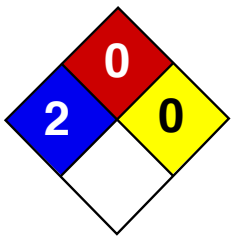

Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

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

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

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

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

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

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

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

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

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

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

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/ central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

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

Other Classifications:

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

DSCL (EEC):
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

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

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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

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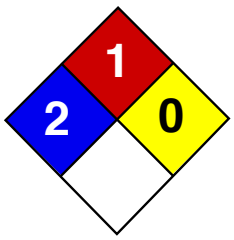

Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C2HCl3

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

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

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

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

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

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

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/

spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 50 STEL: 200 (ppm) from ACGIH (TLV) TWA: 269 STEL: 1070 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

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

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:
Extremely corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 2402 mg/kg [Mouse]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Trichloroethylene Pennsylvania RTK: Trichloroethylene Florida: Trichloroethylene Minnesota: Trichloroethylene Massachusetts RTK: Trichloroethylene New Jersey: Trichloroethylene TSCA 8(b) inventory: Trichloroethylene CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R36/38- Irritating to eyes and skin. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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

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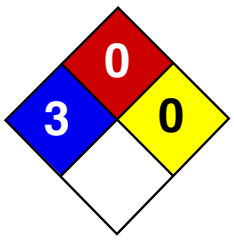

Material Safety Data Sheet
Trichloroacetic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroacetic acid

Catalog Codes: SLT2056, SLT3349

CAS#: 76-03-9

RTECS: AJ7875000

TSCA: TSCA 8(b) inventory: Trichloroacetic acid

CI#: Not applicable.

Synonym: Aceto-caustin; Trichloroacetate; Trichloroethanoic acid; Trichloromethanecarboxylic acid; Acetic acid, trichloro-

Chemical Name: Trichloroacetic Acid

Chemical Formula: CCl3COOH

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroacetic acid	76-03-9	100

Toxicological Data on Ingredients: Trichloroacetic acid LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive), of eye contact (corrosive). Slightly hazardous in case of skin contact (permeator). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to

lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

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

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

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

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

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

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

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

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

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Non combustible.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 1 (ppm) from ACGIH (TLV) [United States] TWA: 1 from NIOSH [United States] TWA: 7 (mg/m3) from NIOSH [United States] TWA: 7 (mg/m3) from OSHA (PEL) [United States] TWA: 1 (ppm) from OSHA (PEL) [United States] TWA: 1 (ppm) [Canada] TWA: 6.7 (mg/m3) [Canada] TWA: 1 (ppm) [United Kingdom (UK)] TWA: 1 (ppm) [France] TWA: 5 (mg/m3) [United Kingdom (UK)] TWA: 5 (mg/m3) [France]3 Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystals solid. Deliquescent crystals solid.)

Odor: Characteristic. Pungent.

Taste: Not available.

Molecular Weight: 163.39 g/mole

Color: White.

pH (1% soln/water): Acidic.

Boiling Point: 195.5°C (383.9°F)

Melting Point: 57.5°C (135.5°F)

Critical Temperature: Not available.

Specific Gravity: Density: 1.6126 @ 64 deg. C(Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 1.3

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Easily soluble in cold water, hot water, diethyl ether, acetone. Solubility in water @ 25 deg. C: 1000 g/100 ml water. Solubility in water @ 25 deg. C: 1306 g/100 g water. Solubility in methanol @ 25 deg. C: 2143 g/ 100 g water. Solubility in ethyl ether @ 25 deg. C: 617 g/100 g water. Solubility in acetone @ 25 deg. C: 850 g/100 g water. Solubility in benzene @ 25 deg. C: 201 g/100 g water. Solubility in o-Xylene @ 25 deg. C: 201 g/100 100 water. It is soluble in ethanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, moisture

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

Corrosivity:
Highly corrosive in presence of aluminum, of zinc. Non-corrosive in presence of glass.

Special Remarks on Reactivity: Incompatible with iron, zinc, aluminum.

Special Remarks on Corrosivity: Corrosive to iron, zinc, aluminum

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

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

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. 3 (Not classifiable for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: lungs.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Trichloroacetic acid UNNA: 1839 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Trichloroacetic acid Illinois toxic substances disclosure to employee act: Trichloroacetic acid Rhode Island RTK hazardous substances: Trichloroacetic acid Pennsylvania RTK: Trichloroacetic acid Massachusetts RTK: Trichloroacetic acid Massachusetts spill list: Trichloroacetic acid New Jersey: Trichloroacetic acid TSCA 8(b) inventory: Trichloroacetic acid

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):
R35- Causes severe burns. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection: j

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

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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

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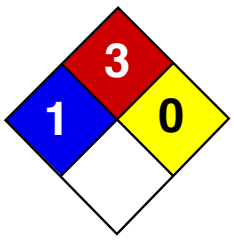

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C3-H6-O

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

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

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:
Store in a segregated and approved area (flammables area) . Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Austalia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

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

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)

Volatility: Not available.

Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. May be harmful if absorbed through the skin. Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizzness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting). Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also

affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects. Chronic Potential Health Effects: Skin: May cause dermatitis. Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Material safety data sheet issued by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

Created: 10/10/2005 08:13 PM

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

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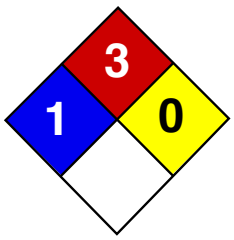

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Methyl ethyl ketone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Methyl ethyl ketone

Catalog Codes: SLM2626, SLM3232

CAS#: 78-93-3

RTECS: EL6475000

TSCA: TSCA 8(b) inventory: Methyl ethyl ketone

CI#: Not applicable.

Synonym: 2-Butanone

Chemical Name: Methyl Ethyl Ketone

Chemical Formula: C4H8O

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Methyl ethyl ketone	78-93-3	100

Toxicological Data on Ingredients: Methyl ethyl ketone: ORAL (LD50): Acute: 2737 mg/kg [Rat]. 4050 mg/kg [Mouse]. DERMAL (LD50): Acute: 6480 mg/kg [Rabbit]. VAPOR (LC50): Acute: 23500 mg/m 8 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation (lung irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

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

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 404°C (759.2°F)

Flash Points: CLOSED CUP: -9°C (15.8°F). OPEN CUP: -5.5556°C (22°F) (Tag).

Flammable Limits: LOWER: 1.8% UPPER: 10%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

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

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Ignition on contact with potassium t-butoxide. Vapor may cause a flash fire

Special Remarks on Explosion Hazards:
Reaction with Hydrogen Peroxide + nitric acid forms heat and shock-sensitive explosive product. Mixture with 2-propanol will produce explosive peroxides during storage.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 200 STEL: 300 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 150 STEL: 300 (ppm) [Australia] TWA: 590 STEL: 885 (mg/m3) from NIOSH TWA: 200 STEL: 300 (ppm) from NIOSH TWA: 590 STEL: 885 (mg/m3) [Canada] TWA: 200 STEL: 300 (ppm) from OSHA (PEL) [United States] TWA: 590 STEL: 885 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Acetone-like Pleasant. Pungent. Sweetish. (Strong.)

Taste: Not available.

Molecular Weight: 72.12g/mole

Color: Clear Colorless.

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

Boiling Point: 79.6 (175.3°F)

Melting Point: -86°C (-122.8°F)

Critical Temperature: 262.5°C (504.5°F)

Specific Gravity: 0.805(Water = 1)

Vapor Pressure: 10.3 kPa (@ 20°C)

Vapor Density: 2.41 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 0.3

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility: Soluble in cold water, diethyl ether, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, mechanical shock, incompatible materials.

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

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with chloroform, copper, hydrogen peroxide, nitric acid, potassium t-butoxide, 2-propanol, chlorosulfonic acid, strong oxidizers, amines, ammonia, inorganic acids, isocyanates, caustics, pyrindines. Vigorous reaction with chloroform +alkali.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2737 mg/kg [Rat]. Acute dermal toxicity (LD50): 6480 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 32000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. May cause damage to the following organs: gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause birth defects based on animal dats. Embryotoxic and/or foetotoxic in animal.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. May be absorbed through the skin. Eyes: Causes eye irritation. Inhalation: Inhalation of high concentrations may cause central nervous effects characterized by headache, dizziness, unconsciousness, and coma. Causes respiratory tract irritation and affects the sense organs. May affect the liver and urinary system. Ingestion: Causes gastrointestinal tract irritation with nausea, vomiting and diarrhea. May affect the liver. Chronic Potential Health Effects: Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 3220 mg/l 96 hours [Fathead Minnow]. 1690 mg/l 96 hours [Bluegill].

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethyl methyl ketone UNNA: 1193 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York release reporting list: Methyl ethyl ketone Rhode Island RTK hazardous substances: Methyl ethyl ketone Pennsylvania RTK: Methyl ethyl ketone Minnesota: Methyl ethyl ketone Massachusetts RTK: Methyl ethyl ketone New Jersey: Methyl ethyl ketone California Director's list of Hazardous Substances: Methyl ethyl ketone TSCA 8(b) inventory: Methyl ethyl ketone TSCA 8(d) H and S data reporting: Methyl ethyl ketone: Effective: 10/4/82; Sunset: 10/4/92 SARA 313 toxic chemical notification and release reporting: Methyl ethyl ketone CERCLA: Hazardous substances.: Methyl ethyl ketone: 5000 lbs. (2268 kg)

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R36/37- Irritating to eyes and respiratory system. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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

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SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 23-Jan-2018 **Revision Number** 3

1. Identification

Product Name **cis-1,2-Dichloroethylene**

Cat No. : **AC113380000; AC113380025; AC113380100; AC113380500**

Synonyms cis-Acetylene dichloride.

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

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

Flammable liquids	Category 2
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed
Harmful if inhaled
Causes serious eye irritation
Causes skin irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Avoid breathing dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Take precautionary measures against static discharge
Do not eat, drink or smoke when using this product
Response
Call a POISON CENTER or doctor/physician if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
Rinse mouth
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Fire
Explosion risk in case of fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store in a well-ventilated place. Keep cool
Store in a closed container
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
cis-1,2-Dichloroethylene	156-59-2	97

4. First-aid measures

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

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

Inhalation	Move to fresh air. Obtain medical attention. If not breathing, give artificial respiration.
Ingestion	Do not induce vomiting. Obtain medical attention.
Most important symptoms and effects	Breathing difficulties. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. Chemical foam. Cool closed containers exposed to fire with water spray.
Unsuitable Extinguishing Media	No information available
Flash Point	6 °C / 42.8 °F
Method -	No information available
Autoignition Temperature	440 °C / 824 °F

Explosion Limits

Upper	12.80%
Lower	9.70%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Hydrogen chloride gas Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing.
Environmental Precautions	See Section 12 for additional ecological information. Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling	Ensure adequate ventilation. Wear personal protective equipment. Use explosion-proof equipment. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
cis-1,2-Dichloroethylene	TWA: 200 ppm			

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-80 °C / -112 °F
Boiling Point/Range	60 °C / 140 °F @ 760 mmHg
Flash Point	6 °C / 42.8 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	12.80%
Lower	9.70%
Vapor Pressure	201 mmHg @ 25 °C
Vapor Density	3.34 (Air = 1.0)
Specific Gravity	1.280
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.

Incompatible Materials Bases

Hazardous Decomposition Products Hydrogen chloride gas, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information
Toxicologically Synergistic Products No information available

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

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

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

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
cis-1,2-Dichloroethylene	156-59-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

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

12. Ecological information

Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea

cis-1,2-Dichloroethylene	Not listed	Not listed	EC50 = 721 mg/L 5 min EC50 = 905 mg/L 30 min	Not listed

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

13. Disposal considerations

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

14. Transport information

DOT

- **UN-No** UN1150
- **Proper Shipping Name** 1,2-DICHLOROETHYLENE
- **Hazard Class** 3
- **Packing Group** II

TDG

- **UN-No** UN1150
- **Proper Shipping Name** 1,2-DICHLOROETHYLENE
- **Hazard Class** 3
- **Packing Group** II

IATA

- **UN-No** 1150
- **Proper Shipping Name** 1,2-DICHLOROETHYLENE
- **Hazard Class** 3
- **Packing Group** II

IMDG/IMO

- **UN-No** 1150
- **Proper Shipping Name** 1,2-DICHLOROETHYLENE
- **Hazard Class** 3
- **Packing Group** II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
cis-1,2-Dichloroethylene	X	-	X	205-859-7	-		-	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

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

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
cis-1,2-Dichloroethylene	X	-	X	-	-

U.S. Department of Transportation

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

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

Other International Regulations

Mexico - Grade No information available

16. Other information

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

Creation Date 22-Sep-2009
Revision Date 23-Jan-2018
Print Date 23-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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

End of SDS

APPENDIX C

Heat Stress/Cold Stress and Related Illnesses

Heat Stress / Cold Stress and Related Illnesses

1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

1.1 Heat Rash

Heat rash also know as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth (i.e. sports drinks).

Caution should be exercised by people with heart problems or those on low sodium diets who work in hot environments. These people should consult a physician about what to do under these conditions.

1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting
- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids.

Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.

As with heat cramps, certain persons should consult with their physician about what to do under these conditions.

1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually $105^{O}F$ or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

1.6 Protecting Against Heat Stress

Several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

2.0 HEAT STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

Generally, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)

- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hardhat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

APPENDIX D

Accident and Injury Report Form

Employee's Report of Injury Form

Instructions: Employees shall use this form to report all work related injuries, illnesses, or "near miss" events (which could have caused an injury or illness) – *no matter how minor*. This helps us to identify and correct hazards before they cause serious injuries. This form shall be completed by employees as soon as possible and given to a supervisor for further action.

I am reporting a work related: ❑ Injury ❑ Illness ❑ Near miss	
Your Name:	
Job title:	
Supervisor:	
Have you told your supervisor about this injury/near miss? ❑ Yes ❑ No	
Date of injury/near miss:	Time of injury/near miss:
Names of witnesses (if any):	
Where, exactly, did it happen?	
What were you doing at the time?	
Describe step by step what led up to the injury/near miss. (continue on the back if necessary):	
What could have been done to prevent this injury/near miss?	
What parts of your body were injured? If a near miss, how could you have been hurt?	
Did you see a doctor about this injury/illness? ❑ Yes ❑ No	
If yes, whom did you see?	Doctor's phone number:
Date:	Time:
Has this part of your body been injured before? ❑ Yes ❑ No	
If yes, when?	Supervisor:
Your signature:	Date:

Supervisor's Accident Investigation Form

Name of Injured Person _____

Date of Birth _____ Telephone Number _____

Address _____

City _____ State_____ Zip _____

(Circle one) Male Female

What part of the body was injured? Describe in detail. _____

_____

What was the nature of the injury? Describe in detail. _____

_____

_____

Describe fully how the accident happened? What was employee doing prior to the event? What equipment, tools being using? _____

_____

_____

Names of all witnesses:

_____ _____

_____ _____

Date of Event _____ Time of Event _____

Exact location of event: _____

What caused the event? _____

_____

_____

Were safety regulations in place and used? If not, what was wrong? _____

_____

Employee went to doctor/hospital? Doctor's Name _____

Hospital Name _____

Recommended preventive action to take in the future to prevent reoccurrence.

_____

_____

_____

_____ _____

Supervisor Signature Date

Incident Investigation Report

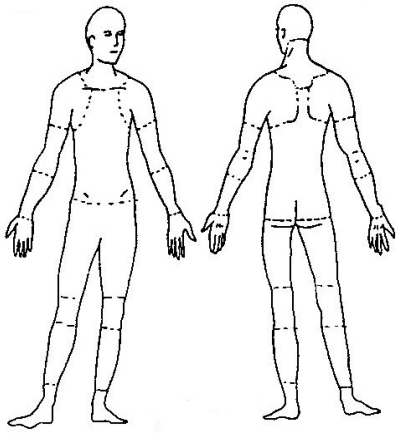
Instructions: Complete this form as soon as possible after an incident that results in serious injury or illness. (Optional: Use to investigate a minor injury or near miss that *could have resulted in a serious injury or illness*.)

This is a report of a: ❑ Death ❑ Lost Time ❑ Dr. Visit Only ❑ First Aid Only ❑ Near Miss	
Date of incident:	This report is made by: ❑ Employee ❑ Supervisor ❑ Team ❑ Other_____

Step 1: Injured employee (complete this part for each injured employee)

Name:	Sex: ❑ Male ❑ Female	Age:
Department:	Job title at time of incident:	

Part of body affected: (shade all that apply)



Nature of injury: (most serious one)
- ❑ Abrasion, scrapes
- ❑ Amputation
- ❑ Broken bone
- ❑ Bruise
- ❑ Burn (heat)
- ❑ Burn (chemical)
- ❑ Concussion (to the head)
- ❑ Crushing Injury
- ❑ Cut, laceration, puncture
- ❑ Hernia
- ❑ Illness
- ❑ Sprain, strain
- ❑ Damage to a body system:
- ❑ Other _____

This employee works:
- ❑ Regular full time
- ❑ Regular part time
- ❑ Seasonal
- ❑ Temporary

Months with this employer

Months doing this job:

Step 2: Describe the incident

Exact location of the incident:	Exact time:

What part of employee's workday? ❑ Entering or leaving work ❑ Doing normal work activities ❑ During meal period ❑ During break ❑ Working overtime ❑ Other_____

Names of witnesses (if any):

Number of attachments:	Written witness statements:	Photographs:	Maps / drawings:

What personal protective equipment was being used (if any)?

Describe, step-by-step the events that led up to the injury. Include names of any machines, parts, objects, tools, materials and other important details.

Description continued on attached sheets: ❑

Step 3: Why did the incident happen?

Unsafe workplace conditions: (Check all that apply)
- ❑ Inadequate guard
- ❑ Unguarded hazard
- ❑ Safety device is defective
- ❑ Tool or equipment defective
- ❑ Workstation layout is hazardous
- ❑ Unsafe lighting
- ❑ Unsafe ventilation
- ❑ Lack of needed personal protective equipment
- ❑ Lack of appropriate equipment / tools
- ❑ Unsafe clothing
- ❑ No training or insufficient training
- ❑ Other: _____

Unsafe acts by people: (Check all that apply)
- ❑ Operating without permission
- ❑ Operating at unsafe speed
- ❑ Servicing equipment that has power to it
- ❑ Making a safety device inoperative
- ❑ Using defective equipment
- ❑ Using equipment in an unapproved way
- ❑ Unsafe lifting
- ❑ Taking an unsafe position or posture
- ❑ Distraction, teasing, horseplay
- ❑ Failure to wear personal protective equipment
- ❑ Failure to use the available equipment / tools
- ❑ Other: _____

Why did the unsafe conditions exist?

Why did the unsafe acts occur?

Is there a reward (such as "the job can be done more quickly", or "the product is less likely to be damaged") that may have encouraged the unsafe conditions or acts? ❑ Yes ❑ No
If yes, describe:

Were the unsafe acts or conditions reported prior to the incident? ❑ Yes ❑ No

Have there been similar incidents or near misses prior to this one? ❑ Yes ❑ No

Step 4: How can future incidents be prevented?

What changes do you suggest to prevent this incident/near miss from happening again?

❑ Stop this activity ❑ Guard the hazard ❑ Train the employee(s) ❑ Train the supervisor(s)

❑ Redesign task steps ❑ Redesign work station ❑ Write a new policy/rule ❑ Enforce existing policy

❑ Routinely inspect for the hazard ❑ Personal Protective Equipment ❑ Other: _____

What should be (or has been) done to carry out the suggestion(s) checked above?

Description continued on attached sheets: ❑

Step 5: Who completed and reviewed this form? (Please Print)

Written by: Department:	Title: Date:
Names of investigation team members:	
Reviewed by:	Title: Date:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 29.10.2012
Print Date 19.04.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

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

1.1 Product identifiers

Product name : Arsenic

Product Number : 267961
Brand : Aldrich
Index-No. : 033-001-00-X
CAS-No. : 7440-38-2

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 Israel Ltd.
3 PARK RABIN, PLAUT
7670603 REHOVOT
ISRAEL

Telephone : +972 8948-4222
Fax : +972 8948-4200

1.4 Emergency telephone number

Emergency Phone # : +972 (8) 948-4222

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)
Acute toxicity, Inhalation (Category 3)
Acute toxicity, Oral (Category 3)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Toxic by inhalation and if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H331 Toxic if inhaled.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/

	physician.
P311	Call a POISON CENTER or doctor/ physician.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)

R-phrase(s)	
R23/25	Toxic by inhalation and if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-phrase(s)	
S20/21	When using do not eat, drink or smoke.
S28	After contact with skin, wash immediately with plenty of soap and water.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : As
Molecular Weight : 74,92 g/mol

Component		Concentration
Arsenic		
CAS-No.	7440-38-2	-
EC-No.	231-148-6	
Index-No.	033-001-00-X	

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

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

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

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

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

4.2 Most important symptoms and effects, both acute and delayed
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

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 water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Arsenic oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

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

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

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

Personal protective equipment

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

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

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, 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 familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

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

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 817 °C - lit.
f)	Initial boiling point and boiling range	613 °C - lit.
g)	Flash point	not applicable
h)	Evaporation 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	5,727 g/mL at 25 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available

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

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Heat. Exposure to air may affect product quality.

10.5 Incompatible materials
Oxidizing agents, Halogens, Palladium undergoes a violent reaction with arsenic, Zinc, Platinum oxide, Nitrogen trichloride, Bromine azide

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 763 mg/kg
Remarks: Behavioral:Ataxia. Diarrhoea

LD50 Oral - mouse - 145 mg/kg
Remarks: Behavioral:Ataxia. Diarrhoea

Inhalation: no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: 1 - Group 1: Carcinogenic to humans (Arsenic)

Reproductive toxicity
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

Potential health effects

Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

Additional Information
RTECS: CG0525000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 9,9 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 3,8 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

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

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: 1558 IMDG: 1558 IATA: 1558

14.2 UN proper shipping name
ADR/RID: ARSENIC
IMDG: ARSENIC
IATA: Arsenic

14.3 Transport hazard class(es)

ADR/RID: 6.1	IMDG: 6.1	IATA: 6.1

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user

no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

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

no data available

15.2 Chemical Safety Assessment

no data available

16. OTHER INFORMATION

Further information

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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.

Lead

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/15/2014 Revision date: 12/15/2014 Version: 1.1

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

1.1. Product identifier

Product form : Substance

CAS No : 7439-92-1

Formula : Pb

Synonyms : C.I. 77575, in massive state / elemental lead, in massive state / glover, in massive state

BIG no : 10073

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

Use of the substance/mixture : Solder
Battery: component
Construction
Electrodes

1.3. Details of the supplier of the safety data sheet

GSC International, Inc.
1747 N. Deffer Drive
Nixa,
MO 65714
United States of America

Tel: 417-374-7431
Fax: 417-374-7442
Email: info@gscinternationalinc.com

1.4. Emergency telephone number

Country	Organization/Company	Address	Emergency number
MEXICO	Servicio de Informacion Toxicologica Sintox	Tintoreto #32 Edif. a Desp. Col. Nochebuena Mixcoac México, D.F.	1 800 009 2800 +52 55 5611 2634 /+52 55 5598 9095
UNITED STATES OF AMERICA	American Association of Poison Control Centers		1-800-222-1222

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302
Acute Tox. 4 (Inhalation)	H332
Carc. 1B	H350
Repr. 1A	H360
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS07 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H302+H332 - Harmful if swallowed or if inhaled
H350 - May cause cancer
H360 - May damage fertility or the unborn child
H373 - May cause damage to organs through prolonged or repeated exposure

H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe dust, fume
P264 - Wash hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P314 - Get medical advice/attention if you feel unwell
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification (GHS-US)
Lead (Main constituent)	(CAS No) 7439-92-1	> 99,9	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Carc. 1B, H350 Repr. 1A, H360 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

4.1. Description of first aid measures

First-aid measures general : If you feel unwell, seek medical advice. IF exposed or concerned: Get medical advice/attention. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Not applicable. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after skin contact : Not applicable. Wash skin with plenty of water.

First-aid measures after eye contact : Not applicable. Rinse eyes with water as a precaution.

First-aid measures after ingestion : Not applicable. Rinse mouth. Call a poison center/doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Adapt extinguishing media to the environment.

Unsuitable extinguishing media : No unsuitable extinguishing media known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : DIRECT FIRE HAZARD. Non combustible.

Explosion hazard	:	DIRECT EXPLOSION HAZARD. No data available on direct explosion hazard. INDIRECT EXPLOSION HAZARD. No data available on indirect explosion hazard.
Reactivity	:	On burning: formation of metallic fumes. Oxidizes on exposure to air.

5.3. Advice for firefighters

Precautionary measures fire	:	Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to heat: have neighborhood close doors and windows.
Firefighting instructions	:	Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it.
Protection during firefighting	:	Heat/fire exposure: compressed air/oxygen apparatus. Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Gloves. Protective clothing. See "Material-Handling" to select protective clothing.
Emergency procedures	:	Mark the danger area. No naked flames.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Prevent soil and water pollution. Prevent spreading in sewers. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Not applicable. Collect spillage.
Methods for cleaning up	:	Recover mechanically the product. Pick-up the material. Take collected spill to manufacturer/competent authority. Notify authorities if product enters sewers or public waters.
Other information	:	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Meet the legal requirements. Do not discharge the waste into the drain. Handle unclean empty containers as full ones. Observe strict hygiene. Measure the concentration in the atmosphere. Carry out operations in the open/under local exhaust/ventilation or with respiratory protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust, fume. Use only outdoors or in a well-ventilated area. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Floors, walls and other surfaces in the hazard area must be cleaned regularly.
Hygiene measures	:	Separate working clothes from town clothes. Launder separately. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Does not require any specific or particular technical measures. Comply with applicable regulations.
Storage conditions	:	Store locked up. Store in a well-ventilated place. Keep cool.
Incompatible materials	:	Strong acids, strong bases and oxidation agents.
Heat-ignition	:	KEEP SUBSTANCE AWAY FROM: heat sources.
Prohibitions on mixed storage	:	KEEP SUBSTANCE AWAY FROM: oxidizing agents. Strong acids. Strong bases.
Storage area	:	Meet the legal requirements.
Special rules on packaging	:	SPECIAL REQUIREMENTS: closing. correctly labeled. meet the legal requirements. Secure fragile packaging in solid containers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Lead (7439-92-1)		
ACGIH	ACGIH TWA (mg/m³)	0,05 mg/m³
ACGIH	Remark (ACGIH)	CNS & PNS impair
OSHA	Not applicable	

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Ensure good ventilation of the work station.

Personal protective equipment : Protective goggles. Gloves.

Materials for protective clothing : GIVE EXCELLENT RESISTANCE: No data available. GIVE GOOD RESISTANCE: butyl rubber. PVC. GIVE LESS RESISTANCE: No data available. GIVE POOR RESISTANCE: No data available.

Hand protection : protective gloves.

Eye protection : Safety glasses.

Skin and body protection : Not required for normal conditions of use.

Respiratory protection : Wear respiratory protection.

Environmental exposure controls : Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Metal.

Molecular mass : 207,20 g/mol

Color : White to blue-grey

Odor : Odorless

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Melting point : 327 °C

Freezing point : No data available

Boiling point : 1740 °C

Flash point : Not applicable

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : < 0,1 hPa

Relative vapor density at 20 °C : No data available

Relative density : 11,3

Specific gravity / density : 11340 kg/m³

Solubility : insoluble in water. Substance sinks in water. Soluble in nitric acid. Insoluble in organic solvents. Water: < 0,1 g/100ml

Log Pow : 0,73 (Estimated value)

Log Kow : No data available

Viscosity, kinematic	:	Not applicable
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosive limits	:	No data available

9.2. Other information

VOC content : Not applicable (inorganic)

SECTION 10: Stability and reactivity

10.1. Reactivity

On burning: formation of metallic fumes. Oxidizes on exposure to air.

10.2. Chemical stability

Unstable on exposure to air.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Acids. Bases.

10.6. Hazardous decomposition products

Thermal decomposition generates : fume.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed. Inhalation: Harmful if inhaled.

Lead (\f)7439-92-1	
LD50 oral rat	> 2000 mg/kg body weight (Rat; Weight of evidence)
LD50 dermal rat	> 2000 mg/kg body weight (Rat; Experimental value; OECD 402: Acute Dermal Toxicity)
ATE US (oral)	500,000 mg/kg body weight
ATE US (gases)	4500,000 ppmV/4h
ATE US (vapors)	11,000 mg/l/4h
ATE US (dust, mist)	1,500 mg/l/4h
Additional information	Lead massive metal is not considered to be acutely toxic. It is not easily inhaled or ingested, and if it is accidentally ingested normally passes through the gastrointestinal system without significant absorption into the body. Lead is not easily absorbed through the skin.

Skin corrosion/irritation : Not classified
(Based on available data, the classification criteria are not met)

Serious eye damage/irritation : Not classified
(Based on available data, the classification criteria are not met)

Respiratory or skin sensitization : Not classified
(Based on available data, the classification criteria are not met)

Germ cell mutagenicity : Not classified
(Based on available data, the classification criteria are not met)

Carcinogenicity : May cause cancer.

Lead (7439-92-1)	
Additional information	There is some evidence that inorganic lead compounds may have a carcinogenic effect, and they have been classified by IARC as probably carcinogenic to humans. However, it is considered that this classification does not apply to lead in articles, given the very low bioavailability of metallic lead. Carcinogenicity studies of lead metal powder have been negative. Epidemiology studies of workers exposed to inorganic lead compounds have found a limited association with stomach cancer. IARC has concluded that lead metal is possibly carcinogenic to humans (Group aB).
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	3 - Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : May damage fertility or the unborn child.

Specific target organ toxicity (single exposure) : Not classified

(Based on available data, the classification criteria are not met)

Specific target organ toxicity (repeated exposure) : May cause damage to organs through prolonged or repeated exposure.

Lead (7439-92-1)	
Additional information	Lead is a cumulative poison and may be absorbed into the body through ingestion or inhalation. Although inhalation and ingestion of lead in massive form are unlikely, poor hygiene practises may result in hand to mouth transfer which maybe significant over a prolonged period of time. Inorganic lead compounds have been documented in observational human studies to produce toxicity in multiple organ systems and body function including the haemotopoetic (blood) system, kidney function, reproductive function and the central nervous system.

Aspiration hazard : Not classified

(Based on available data, the classification criteria are not met)

Symptoms/injuries after inhalation : No effects known.

Symptoms/injuries after skin contact : No effects known.

Symptoms/injuries after eye contact : No effects known.

Symptoms/injuries after ingestion : No effects known.

Chronic symptoms : No effects known.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Dangerous for the environment. Very toxic to aquatic life with long lasting effects.

Ecology - air : Not dangerous for the ozone layer (Regulation (EC) No 1005/2009). Not included in the list of fluorinated greenhouse gases (Regulation (EC) No 842/2006). TA-Luft Klasse 5.2.2/II.

Ecology - water : No water pollutant (surface water). Maximum concentration in drinking water: 0.010 mg/l (lead) (Directive 98/83/EC). Highly toxic to aquatic organisms.

Lead (7439-92-1)	
LC50 fish 1	2,8 (0,44 - 542) mg/l (96h) Coughlan, D.J., S.P. Gloss, and J. Kubota 1986. Acute and Sub-Chronic Toxicity of Lead to the Early Life Stages of Small mouth Bass (Micropterus dolomieui). Water Air Soil Pollut. 28(3/4):265-275
EC50 Daphnia 1	4,46 (0,53 - 5,1) mg/l (48h) Govindarajan, S., C.P. Valsaraj, R. Mohan, V. Hariprasad, and R. Ramasubramanian 1993. Toxicity of Heavy Metals in Aquaculture Organisms: Penaeus indicus, Perna viridis, Artemia salina and Skeletonema costatum. Pollut.Res. 12(3):187-189

12.2. Persistence and degradability

Lead (7439-92-1)	
Persistence and degradability	Biodegradability: Not applicable. No (test)data available on mobility of the substance.
ThOD	Not applicable (inorganic)

12.3. Bioaccumulative potential

Lead (7439-92-1)	
Log Pow	0,73 (Estimated value)
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on ozone layer :

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Reuse or recycle following decontamination. Remove to an authorized dump (Class I). Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001).

Additional information : LWCA (the Netherlands): KGA category 05. Hazardous waste according to Directive 2008/98/EC.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN3077 Environmentally hazardous substances, solid, n.o.s. Lead(7439-92-1), 9, III

UN-No.(DOT) : UN3077

Proper Shipping Name (DOT) : Environmentally hazardous substances, solid, n.o.s.
Lead(7439-92-1)

Department of Transportation (DOT) Hazard Classes : 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140

Hazard labels (DOT) : 9 - Class 9 (Miscellaneous dangerous materials)

DOT Symbols : G - Identifies PSN requiring a technical name

Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102)	:	8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description “Other regulated substances, liquid or solid, n.o.s.”, as appropriate. In addition, for solid materials, special provision B54 applies. 146 - This description may be used for a material that poses a hazard to the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination. 335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as “Environmentally hazardous substances, solid, n.o.s,” UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging. A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg: a. Metal: 11A, 11B, 11N, 21A, 21B and 21N b. Rigid plastics: 11H1, 11H2, 21H1 and 21H2 c. Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2 d. Fiberboard: 11G e. Wooden: 11C, 11D and 11F (with inner liners) f. Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner). B54 - Open-top, sift-proof rail cars are also authorized. IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner. N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle. T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	155
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	213
DOT Packaging Bulk (49 CFR 173.xxx)	:	240
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	No limit
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	No limit
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Additional information

Other information : No supplementary information available.

ADR

No additional information available

Transport by sea

UN-No. (IMDG)	:	3077
Proper Shipping Name (IMDG)	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Class (IMDG)	:	9 - Miscellaneous dangerous compounds
Packing group (IMDG)	:	III - substances presenting low danger

Air transport

UN-No.(IATA)	:	3077
Proper Shipping Name (IATA)	:	Environmentally hazardous substance, solid, n.o.s.
Class (IATA)	:	9 - Miscellaneous Dangerous Goods
Packing group (IATA)	:	III - Minor Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313 Not listed on the United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	10 lb

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Repr. 1A	H360Df
Acute Tox. 4 (Inhalation)	H332
Acute Tox. 4 (Oral)	H302
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of H-phrases: see section 16

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Repr.Cat.1; R61
Repr.Cat.3; R62
Xn; R20/22
R33
N; R50/53

Full text of R-phrases: see section 16

15.2.2. National regulations

Lead (7439-92-1)
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

No additional information available

SECTION 16: Other information

Revision date	:	12/15/2014

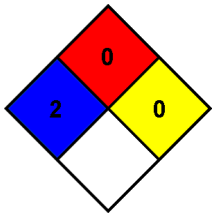
Full text of H-phrases:

Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H302	Harmful if swallowed
H332	Harmful if inhaled
H350	May cause cancer
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : * Chronic Hazard - Chronic (long-term) health effects may result from repeated overexposure

Flammability : 0 Minimal Hazard

Physical : 0 Minimal Hazard

Personal Protection : B

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

MERCURY

Safety Data Sheet

According to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

Date of issue: 11/19/2013

Mercury Thermometers, Dial Thermometer and Temperature Chart Recorders are considered "manufactured articles," and as such, do not require a SDS. Per 29CFR 1910.1200(c),*"Definitions. Article* means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk…"
If broken, the instrument may release quantities of mercury, which should be addressed using the information provided in this SDS.

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

1.1. Product identifier

Trade name : MERCURY

CAS No : 7439-97-6

Other means of identification : Colloidal Mercury, Quick Silver, Liquid Silver, NCI-C60399, Hydrargyrum

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

Use of the substance/mixture : Variety of industrial, analytical and research applications.

1.3. Details of the supplier of the safety data sheet

Palmer Instruments, Inc.
234 Old Weaverville Road
Asheville, NC 28804
USA

1.4. Emergency telephone number

Emergency number:: 1-800-373-7542 Hazmat Service, Inc.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Acute Tox. 1 (Inhalation:dust,mist)	H330
Repr. 1B	H360
STOT RE 1	H372
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :

GHS06 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H330 - Fatal if inhaled
H360 - May damage fertility or the unborn child
H372 - Causes damage to organs through prolonged or repeated exposure
H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe vapors, gas
P264 - Wash skin, hands thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P273 - Avoid release to the environment
P280 - Wear eye protection, protective clothing, protective gloves, Face mask
P284 - [In case of inadequate ventilation] wear respiratory protection
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P308+P313 - IF exposed or concerned: Get medical advice/attention
P310 - Immediately call a POISON CENTER/doctor/…
P314 - Get medical advice and attention if you feel unwell
P320 - Specific treatment is urgent (see First aid measures on this label)
P391 - Collect spillage
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to comply with applicable local, national and international regulation.

2.3. Other hazards

other hazards which do not result in classification : When inhaled, Mercury will be rapidly distributed throughout the body. During this time, Mercury will cross the blood-brain barrier, and become oxidized to the Hg (II) oxidation state. The oxidized species of Mercury cannot cross the blood-brain barrier and thus accumulates in the

brain. Mercury in other organs is removed slowly from the body via the kidneys. The average half-time for clearance of Mercury for different parts of the human body is as follows: lung: 1.7 days; head: 21 days; kidney region: 64 days; chest: 43 days; whole body: 58 days. Mercury can be irritating to contaminated skin and eye. Prolonged contact may lead to ulceration of the skin. Allergic reactions (i.e. rashes, welts) may occur in sensitive individuals. Mercury can be irritating to contaminated skin and eyes. Short-term over-exposures to high concentrations of mercury vapors can lead to breathing difficulty, coughing, acute, and potentially fatal lung disorders. Depending on the concentration of inhalation over-exposure, heart problems, damage to the kidney, liver or nerves and effects on the brain may occur.

2.4. Unknown acute toxicity (GHS-US)

No Data Available

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

Full text of H-phrases: see section 16

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Mercury	(CAS No) 7439-97-6	100	Acute Tox. 2 (Inhalation), H330 Repr. 1B, H360 STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

SECTION 4: First aid measures

4.1 Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. Assure fresh air breathing. Allow the victim to rest. Immediately call a POISON CENTER or doctor/physician. In case of irregular breathing or respiratory arrest provide artificial respiration.

First-aid measures after skin contact : Wash immediately with lots of water (15 minutes)/shower. Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. Seek immediate medical advice.

First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Keep eye wide open while rinsing. Seek medical attention immediately.

First-aid measures after ingestion : Immediately call a POISON CENTER or doctor/physician. Rinse mouth. If conscious, give large amounts of water and induce vomiting. Give water or milk if the person is fully conscious. Obtain emergency medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Short-term over-exposures to high concentrations of mercury vapors can lead to breathing difficulty, coughing, acute, chemical pneumonia, and pulmonary edema (a potentially fatal accumulation of fluid in the lungs) . Depending on the concentration of over-exposure, cardiac abnormalities, damage to the kidney, liver or nerves and effects on the brain may occur. Long-term inhalation over-exposures can lead to the development of a wide variety of symptoms, including the following: excessive salivation, gingivitis, anorexia, chills, fever, cardiac abnormalities, anemia, digestive problems, abdominal pains, frequent urination, an inability to urinate, diarrhea, peripheral neuropathy (numbness, weakness, or burning sensations in the hands or feet), tremors (especially in the hands, fingers, eyelids, lips, cheeks, tongue, or legs), alteration of tendon reflexes, slurred speech, visual disturbances, and deafness. Allergic reactions (i.e. breathing difficulty) may also occur in sensitive individuals.

Symptoms/injuries after skin contact : Symptoms of skin exposure can include redness, dry skin, and pain. Prolonged contact may lead to ulceration of the skin. Allergic reactions (i.e. rashes, welts) may occur in sensitive individuals. Dermatitis (redness and inflammation of the skin) may occur after repeated skin exposures.

Symptoms/injuries after eye contact : Symptoms of eye exposure can include redness, pain, and watery eyes. A symptom of Mercury exposure is discoloration of the lens of the eyes.

Symptoms/injuries after ingestion : If Mercury is swallowed, symptoms of such over-exposure can include metallic taste in mouth, nausea, vomiting, central nervous system effects, and damage to the kidneys. Metallic mercury is not usually absorbed sufficiently from the gastrointestinal tract to induce an acute, toxic response. Damage to the tissues of the mouth, throat, esophagus, and other tissues of the digestive system may occur. Ingestion may be fatal, due to effects on gastrointestinal system and kidneys.

Chronic symptoms : Long-term over-exposure can lead to a wide range of adverse health effects. Anyone using Mercury must pay attention to personality changes, weight loss, skin or gum discolorations, stomach pains, and other signs of Mercury over-exposure. Gradually developing syndromes ("Erethism" and "Acrodynia") are indicative of potentially severe health problems. Mercury can cause the development of allergic reactions (i.e. dermatitis, rashes, breathing difficulty) upon prolonged or repeated exposures. Refer to Section 11 (Toxicology Information) for additional data

4.3 Indication of any immediate medical attention and special treatment needed

Treatment for Mercury over-exposure must be given. The following treatment protocol for ingestion of Mercury is from Clinical Toxicology of Commercial Products (5th Edition, 1984).

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Not flammable. Mercury vapors and oxides generated during fires involving this product are toxic.

Reactivity : Stable. Reacts with (some) metals. Mercury can react with metals to form amalgams.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment. Do not allow run-off from fire fighting to enter drains or water courses.

Protective equipment for firefighters : Do not enter fire area without proper protective equipment, including respiratory protection.

Other information : Decontaminate all equipment thoroughly after the conclusion of fire-fighting activities.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Uncontrolled release should be responded to by trained personnel using pre-planned procedures. Evacuate area. Evacuate personnel to a safe area.

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection. In the event of a release under 1 pound: the minimum level “C” Personal Protective Equipment is needed. Triple-gloves (rubber gloves and nitril gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Air-Purifying Respirator with Cartridge appropriate for Mercury.
In the event of a release over 1 pound or when concentration of oxygen in atmosphere is less than 19.5% or unknown, the level “B” Personal Protective Equipments which includes Self-Contained Breathing Apparatus must be worn.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment : For larger spills, dike area and pump into waste containers. Put into a labelled container and provide safe disposal.

Methods for cleaning up : There are a variety of methods which can be used to clean-up Mercury spills. Use a commercially available Mercury Spill Kit for small spills. A suction pump with aspirator can also be used during clean-up operations. For larger release, a Mercury vacuum can be used. Calcium polysulfide or excess sulfur can be also used for clean-up. Mercury can migrate into cracks and other difficult-to-clean areas; calcium polysulfide and sulfur can be sprinkled effectively into these areas. Decontaminate the area thoroughly. The area should be inspected visually and with colorimetric tubes for Mercury to ensure all traces have been removed prior to re-occupation by non-emergency personnel. Decontaminate all equipment used in response thoroughly. If such equipments cannot de adequately decontaminated, it must be discarded with other spill residue. Place all spill residues in an appropriate container, seal immediately, and label appropriately. Dispose of in accordance with federal, state, and local hazardous waste disposal requirements. (Refer to Section 13 of this SDS).

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Supervisors and responsible personnel must be aware of personality changes, weight loss, or other sign of Mercury over-exposure in employees using this product; These symptoms can develop gradually and are indicative of potentially severe health effects related to Mercury contamination.

Precautions for safe handling	:	As with all chemicals, avoid getting Mercury ON YOU or IN YOU. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Report all Mercury releases promptly. Open container slowly on a stable surface. Drums, flasks and bottles of this product must be properly labeled. Empty containers may contain residual amounts of Mercury and should be handled with care.
Hygiene measures	:	Do not eat, drink or smoke when using this product. Always wash hands and face immediately after handling this product, and once again before leaving the workplace. Remove contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Follow practice indicated in Section 6. Make certain that application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment thoroughly before maintenance begins.
Storage conditions	:	Keep container tightly closed. Store drums, flasks and bottles in a cool, dry location, away from direct sunlight, source of intense heat, or where freezing is possible. Store away from incompatible materials. Material should be stored in secondary container or in a diked area, as appropriate.
Incompatible materials	:	Acetylene and acetylene derivatives, amines, ammonia, 3-bromopropyne, boron diiodophosphide, methyl azide, sodium carbide, heated sulfuric acid, methylsilane/oxygen mixtures, nitric acid/alcohol mixtures, tetracarbonylnickel/oxygen mixtures, alkyne/silver perchlorate mixtures, halogens and strong oxidizers. Mercury can attack copper alloys. Mercury can react with many metals (i.e. calcium, lithium, potassium, sodium, rubidium, aluminum) to form amalgams.
Prohibitions on mixed storage	:	Mercury can attack copper alloys. Mercury can react with many metals (i.e. calcium, lithium, potassium, sodium, rubidium, aluminum) to form amalgams.
Storage area	:	Storage area should be made of fire-resistant materials.
Special rules on packaging	:	Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Mercury (7439-97-6)		
USA ACGIH	ACGIH TWA (mg/m³)	0,025 mg/m³
USA OSHA	OSHA PEL (Ceiling) (mg/m³)	0,1 mg/m³

8.2 Exposure controls

Appropriate engineering controls	:	Ensure adequate ventilation. Ensure exposure is below occupational exposure limits (where available). Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Personal protective equipment	:	Avoid all unnecessary exposure. Gloves. Protective clothing. Safety glasses. Mist formation: aerosol mask.

Hand protection	:	Wear neoprene gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 of this SDS.
Eye protection	:	Splash goggles or safety glasses. For operation involving the use of more than 1 pound of Mercury, or if the operation may generate a spray of Mercury, the use of a faceshield is recommended.
Skin and body protection	:	Wear suitable protective clothing.
Respiratory protection	:	Maintain airborne contaminants concentration below provided exposure limits. If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134 or applicable state regulations. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown.
Other information	:	Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Color	:	Silver white.

Odor	:	Odorless.
Odor threshold	:	Not applicable
pH	:	Not applicable
Relative evaporation rate (butylacetate=1)	:	No data available
Melting point	:	No data available
Freezing point	:	-38,87 °C (-37.97 F)
Boiling point	:	No data available
Flash point	:	Not applicable
Self ignition temperature	:	Not applicable
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapour pressure	:	0,002 mm Hg at 25°C
Relative vapor density at 20 °C	:	6,9 (Air = 1)
Relative density	:	No data available
Relative density of saturated gas/air mixture	:	13,6
Solubility	:	No data available
Log Pow	:	No data available
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosive limits	:	Not applicable

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable. Reacts with (some) metals. Mercury can react with metals to form amalgams.

10.2. Chemical stability

Not established.

10.3. Possibility of hazardous reactions

Not established. Hazardous polymerization will not occur.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Acetylene and acetylene derivatives, amines, ammonia, 3-bromopropyne, boron diiodophosphide, methyl azide, sodium carbide, heated sulfuric acid, methylsilane/oxygen mixtures, nitric acid/alcohol mixtures, tetracarbonylnickel/oxygen mixtures, alkyne/silver perchlorate mixtures, halogens and strong oxidizers. Mercury can attack copper alloys. Mercury can react with many metals (i.e. calcium, lithium, potassium, sodium, rubidium, aluminum) to form amalgams.

10.6. Hazardous decomposition products

If this product is exposed to extremely high temperature in the presence of oxygen or air, toxic vapor of mercury and mercury oxides will be generated.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	:	Fatal if inhaled.
Skin corrosion/irritation	:	Not classified pH: Not applicable
Serious eye damage/irritation	:	Not classified pH: Not applicable
Respiratory or skin sensitisation	:	Not classified
Germ cell mutagenicity	:	Not classified Based on available data, the classification criteria are not met
Carcinogenicity	:	Not classified

Mercury (7439-97-6)	
IARC group	3

Reproductive toxicity : May damage fertility or the unborn child.
Based on available data, the classification criteria are not met

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Causes damage to organs through prolonged or repeated exposure.
Based on available data, the classification criteria are not met
Causes damage to organs through prolonged or repeated exposure

Aspiration hazard : Not classified
Based on available data, the classification criteria are not met

Potential adverse human health effects and symptoms : Based on available data, the classification criteria are not met. Fatal if inhaled.

Symptoms/injuries after inhalation : Short-term over-exposures to high concentrations of mercury vapors can lead to breathing difficulty, coughing, acute,chemical pneumonia, and pulmonary edema (a potentially fatal accumulation of fluid in the lungs) . Depending on the concentration of over-exposure, cardiac abnormalities, damage to the kidney, liver or nerves and effects on the brain may occur. Long-term inhalation over-exposures can lead to the development of a wide variety of symptoms, including the following: excessive salivation, gingivitis, anorexia, chills, fever, cardiac abnormalities, anemia, digestive problems, abdominal pains, frequent urination, an inability to urinate, diarrhea, peripheral neuropathy (numbness, weakness, or burning sensations in the hands or feet), tremors (especially in the hands, fingers, eyelids, lips, cheeks, tongue, or legs), alteration of tendon reflexes, slurred speech, visual disturbances, and deafness. Allergic reactions (i.e. breathing difficulty) may also occur in sensitive individuals.

Symptoms/injuries after skin contact : Symptoms of skin exposure can include redness, dry skin, and pain. Prolonged contact may lead to ulceration of the skin. Allergic reactions (i.e. rashes, welts) may occur in sensitive individuals. Dermatitis (redness and inflammation of the skin) may occur after repeated skin exposures.

Symptoms/injuries after eye contact : Symptoms of eye exposure can include redness, pain, and watery eyes. A symptom of Mercury exposure is discoloration of the lens of the eyes.

Symptoms/injuries after ingestion : If Mercury is swallowed, symptoms of such over-exposure can include metallic taste in mouth, nausea, vomiting, central nervous system effects, and damage to the kidneys. Metallic mercury is not usually absorbed sufficiently from the gastrointestinal tract to induce an acute, toxic response. Damage to the tissues of the mouth, throat, esophagus, and other tissues of the digestive system may occur. Ingestion may be fatal, due to effects on gastrointestinal system and kidneys.

Chronic symptoms : Long-term over-exposure can lead to a wide range of adverse health effects. Anyone using Mercury must pay attention to personality changes, weight loss, skin or gum discolorations, stomach pains, and other signs of Mercury over-exposure. Gradually developing syndromes ("Erethism" and "Acrodynia") are indicative of potentially severe health problems. Mercury can cause the development of allergic reactions (i.e. dermatitis, rashes, breathing difficulty) upon prolonged or repeated exposures. Refer to Section 11 (Toxicology Information) for additional data.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Mercury (7439-97-6)	
LC50 fishes 1	0,5 mg/l (Exposure time: 96 h - Species: Cyprinus carpio)
EC50 Daphnia 1	5,0 µg/l (Exposure time: 96 h - Species: water flea)
LC50 fish 2	0,16 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])

12.2. Persistence and degradability

MERCURY (7439-97-6)	
Persistence and degradability	May cause long-term adverse effects in the enviroment

12.3 Bioaccumulative potential

MERCURY (7439-97-6)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Waste disposal must be in accordance with appropriate federal, state, and local regulations. This product, if unaltered by use, should be recycled. If altered by use, recycling may be possible. Consult Bethlehem Apparatus Company for information. If Mercury must be disposed of as hazardous waste, it must be handled at a permitted facility or as advised by your local hazardous waste regulatory authority.

Ecology - waste materials : Hazardous waste due to toxicity. Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT

14.1. UN number

UN-No.(DOT) : 2809

DOT NA no. UN2809

14.2. UN proper shipping name

DOT Proper Shipping Name : Mercury

Department of Transportation (DOT) Hazard Classes : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive substances
6.1 - Toxic substances

DOT Symbols : A - Material is regulated as a hazardous material only when be transported by air, W - Material is regulated as a hazardous material only when be transported by water

Packing group (DOT) : III - Minor Danger

DOT Packaging Exceptions (49 CFR 173.xxx) : 164

DOT Packaging Non Bulk (49 CFR 173.xxx) : 164

DOT Packaging Bulk (49 CFR 173.xxx) : 240

14.3. Additional information

Other information : No supplementary information available.

Overland transport

No additional information available

Transport by sea

DOT Vessel Stowage Location : B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other : 40 - Stow ‘‘clear of living quarters’’,97 - Stow ‘‘away from’’ azides

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 35 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 35 kg

SECTION 15: Regulatory information

15.1. US Federal regulations

Mercury (7439-97-6)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on SARA Section 313 (Specific toxic chemical listings)	
EPA TSCA Regulatory Flag	S - S - indicates a substance that is identified in a proposed or final Significant New Uses Rule.
SARA Section 313 - Emission Reporting	1,0 %

15.2. International regulations

Canada

Mercury (7439-97-6)	
Listed on the Canadian DSL (Domestic Sustances List) inventory.	
WHMIS Classification	Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class E - Corrosive Material

EU-Regulations

Mercury (7439-97-6)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) substances.

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Classification according to Directive 67/548/EEC or 1999/45/EC

Not classified

15.2.2 National regulations

Mercury (7439-97-6)

Listed on the AICS (the Australian Inventory of Chemical Substances)
Listed on Inventory of Existing Chemical Substances (IECSC)
Listed on the Korean ECL (Existing Chemical List) inventory.
Listed on New Zealand - Inventory of Chemicals (NZIoC)
Listed on Inventory of Chemicals and Chemical Substances (PICCS)
Poisonous and Deleterious Substances Control Law
Pollutant Release and Transfer Register Law (PRTR Law)
Listed on the Canadian Ingredient Disclosure List

15.3. US State regulations

Mercury (7439-97-6)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
	Yes			

SECTION 16: Other Information

Other information : None.

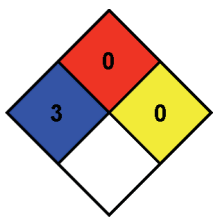
Full text of H-phrases: see section 16:

Acute Tox. 1 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 1
Acute Tox. 2 (Inhalation)	Acute toxicity (inhalation) Category 2
Aquatic Acute 1	Hazardous to the aquatic environment — AcuteHazard, Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
Repr. 1B	Reproductive toxicity Category 1B
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
H330	Fatal if inhaled
H360	May damage fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

Name	Product identifier	%	GHS-US classification
Mercury	(CAS No) 7439-97-6	100	Acute Tox. 2 (Inhalation), H330 Repr. 1B, H360 STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

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Material Safety Data Sheet
Zinc, Granular and Mossy

MSDS# 88125

Section 1 - Chemical Product and Company Identification

MSDS Name:	Zinc, Granular and Mossy
Catalog Numbers:	AC201450000, AC201455000, AC222600000, AC222600030, AC222601000, AC222605000 AC222605000, AC222610000, AC222610025, AC222611000, AC222615000, Z11-500, Z15-3, Z15-3LC, Z15-500, Z16-500, Z2-3, Z2-500
Synonyms:	None

Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#:	7440-66-6
Chemical Name:	Zinc
%:	100
EINECS#:	231-175-3

Hazard Symbols: N

Risk Phrases: 50/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Target Organs: No data found.

Potential Health Effects

Eye:	May cause eye irritation.
Skin:	May cause skin irritation. May be harmful if absorbed through the skin.
Ingestion:	May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation:	May cause respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May be harmful if inhaled.
Chronic:	Repeated inhalation may cause chronic bronchitis.

Section 4 - First Aid Measures

Eyes:	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:	Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
	Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4

Ingestion:	cupfuls of milk or water.
Inhalation:	Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:	
Antidote:	The use of Calcium disodium EDTA as a chelating agent should be determined by qualified medical personnel.

Section 5 - Fire Fighting Measures

General Information:	As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire.
Extinguishing Media:	Do NOT use water directly on fire. Use dry chemical to fight fire. Use approved class D extinguishing agents or smother with dry sand, clay, or sodium bicarbonate.
Autoignition Temperature:	460 deg C (860.00 deg F)
Flash Point:	Not available
Explosion Limits: Lower:	Not available
Explosion Limits: Upper:	Not available
NFPA Rating:	health: 1; flammability: 1; instability: 0;

Section 6 - Accidental Release Measures

General Information:	Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:	Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling:	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation. Do not allow contact with water. Keep from contact with moist air and steam.
Storage:	Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Zinc	none listed	none listed	none listed

OSHA Vacated PELs: Zinc: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Personal Protective Equipment

Eyes:	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin:	Wear appropriate protective gloves to prevent skin exposure.
Clothing:	Wear appropriate protective clothing to prevent skin exposure.
Respirators:	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if

irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Color: bluish white, silvery gray
Odor: odorless
pH: Not available
Vapor Pressure: 1 mm Hg @ 487 deg C
Vapor Density: Not available
Evaporation Rate: Not applicable
Viscosity: Not applicable
Boiling Point: 907 deg C (1,664.60°F)
Freezing/Melting Point: 419 deg C (786.20°F)
Decomposition Temperature: Not available
Solubility in water: Reacts with water
Specific Gravity/Density: 7.14
Molecular Formula: Zn
Molecular Weight: 65.38

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, excess heat, strong oxidants, exposure to moist air or water.
Incompatibilities with Other Materials: Oxidizing agents, acids, bases.
Hazardous Decomposition Products: Toxic fumes of zinc oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 7440-66-6: ZG8600000
LD50/LC50: RTECS: Not available.
Carcinogenicity: Zinc - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Other: Do not empty into drains.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: Not Regulated
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 7440-66-6: 1000 lb final RQ (no reporting of releases of this hazardous substa

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: N

Risk Phrases:

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 60 This material and its container must be disposed of as hazardous waste.

WGK (Water Danger/Protection)

CAS# 7440-66-6: 0

Canada

CAS# 7440-66-6 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not available

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7440-66-6 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 7440-66-6 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 4/09/1998

Revision #6 Date 7/20/2009

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

Chromium, Reagent Grade,

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

Product name : **Chromium, Reagent Grade,**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25249A**

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:

Environmentally Damaging
Chronic hazards to the aquatic environment, category 1
Acute hazards to the aquatic environment, category 1

Aquatic Acute 1
Aquatic Chronic 1

Signal word :Warning

Hazard statements:
Very toxic to aquatic life with long lasting effects
Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Do not eat, drink or smoke when using this product
Avoid release to the environment
Collect spillage
Dispose of contents and container to an approved waste disposal plant

Other Non-GHS Classification:

WHMIS
NFPA/HMIS

Copper, Granular, 50 Mesh,

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

Product name : **Copper, Granular, 50 Mesh,**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25268**

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:

Toxic
Acute toxicity (oral, dermal, inhalation), category 2

Irritant
Eye irritation, category 2A
Skin sensitization, category 1

Health hazard
Germ cell mutagenicity, category 1A
Specific target organ toxicity following repeated exposure, category 2

Acute toxicity - Oral - Category 2: H300 Fatal if swallowed.
Acute toxicity - Inhalation - Category 2: H330 Fatal if inhaled.
Specific target organ toxicity - Repeated exposure - (Oral,Inhalation) - Category 2: H373 May cause damage to digestive system, hematopoietic system, kidneys, nose, respiratory system, and/or skin through prolonged or repeated exposure if inhaled
Hazards Not Otherwise Classified - Combustible Dust
Not classified for physical or health hazards under GHS.
Hazards Not Otherwise Classified - Combustible Dust
Serious Eye Damage/Eye Irritation - Category 2: H319 Causes serious eye irritation.
Skin sensitizers - Category 1: H317 May cause allergic skin reaction.
Germ cell mutagenicity - Category 1: H340 May cause genetic defects.
Hazardous to aquatic environment - acute hazard - Category 1: H400 Very toxic to aquatic life.

Signal word :Danger

Hazard statements:
Fatal if swallowed
Fatal if inhaled

May cause an allergic skin reaction
Causes serious eye irritation
May cause genetic defects
May cause damage to organs through prolonged or repeated exposure
Very toxic to aquatic life

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Wash skin thoroughly after handling
Avoid release to the environment
Do not eat, drink or smoke when using this product
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapours/spray
Use only outdoors or in a well-ventilated area
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Wash contaminated clothing before reuse
IF exposed or concerned: Get medical advice/attention
Collect spillage
Specific treatment (see supplemental first aid instructions on this label)
Rinse mouth
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do.
Continue rinsing
If eye irritation persists get medical advice/attention
IF ON SKIN: Wash with soap and water
If skin irritation or a rash occurs: Get medical advice/attention
Store locked up
Dispose of contents and container as instructed in Section 13

Combustible Dust Hazard: :
May form combustible dust concentrations in air (during processing).
Combustible Dust Hazard: :
May form combustible dust concentrations in air (during processing).

Other Non-GHS Classification:

WHMIS

D2B

B4

NFPA/HMIS

NFPA SCALE (0-4)

HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7440-50-8	Copper	100 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Loosen clothing as necessary and position individual in a comfortable position.Move exposed to fresh air. Give artificial respiration if necessary. If breathing is difficult give oxygen.Get medical assistance if cough or other symptoms appear.

After skin contact: Rinse/flush exposed skin gently using soap and water for 15-20 minutes.Seek medical advice if discomfort or irritation persists.

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. 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. Seek medical attention if irritation, discomfort or vomiting persists.Never give anything by mouth to an unconscious person.

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.Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition. Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

For safety reasons unsuitable extinguishing agents: None identified.

Special hazards arising from the substance or mixture:

Oxides of copper.Combustion products may include carbon oxides or other toxic vapors.Thermal decomposition can lead to release of irritating gases and vapors. Dust can be an explosion hazard when exposed to heat or flame. Noncombustible solid in bulk form, but powdered form may ignite.

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.Use spark-proof tools and explosion-proof equipment.Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.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:

Wear protective equipment. Use spark-proof tools and explosion-proof equipment.Ensure that air-handling systems are operational.Ensure adequate ventilation.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13. Should not be released into environment.

Methods and material for containment and cleaning up:

Keep in suitable closed containers for disposal.Wear protective eyeware, gloves, and clothing. Refer to Section 8.Always obey local regulations.Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Collect solids in powder form using vacuum with (HEPA filter). Evacuate personnel to safe areas.Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Minimize dust generation and accumulation. Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Do not eat, drink, smoke, or use personal products when handling chemical substances. Avoid contact with eyes, skin, and clothing.

Conditions for safe storage, including any incompatibilities:

Store away from incompatible materials.Protect from freezing and physical damage.Keep away from food and beverages.Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Store in cool, dry conditions in well sealed containers. Store with like hazards

SECTION 8 : Exposure controls/personal protection

Control Parameters:

7440-50-8 , Copper , OSHA PEL TWA (Total Dust) TWA 1 mg/m3
7440-50-8, Copper, ACGIH TLV: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists)
7440-50-8, Copper, OSHA PEL: 0.1 mg/m3 TWA (fume)

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.It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment.Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).Use under a fume hood
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:	Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).Safety glasses or goggles are appropriate eye protection.
General hygienic measures:	Perform routine housekeeping.Wash hands before breaks and at the end of work.Avoid contact with skin, eyes, and clothing.Before wearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Red to brown solid	**Explosion limit lower**: **Explosion limit upper**:	Not determined Not determined
Odor:	Odorless	**Vapor pressure**:	Not determined
Odor threshold:	Not determined	**Vapor density**:	Not determined
pH-value:	Not determined	**Relative density**:	Not determined
Melting/Freezing point:	1083°C (1981.4°F)	**Solubilities**:	Insoluble
Boiling point/Boiling range:	2595°C (4703°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: 8.94 (Water = 1)			

SECTION 10 : Stability and reactivity

Reactivity: Stable at room temperature in closed containers under normal storage and handling conditions.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing
Conditions to avoid: Incompatible Materials.Dust formation.Moisture.Exposure to air.
Incompatible materials: Liquid copper explodes on contact with water. Reacts violently with ammonium nitrate, bromates, iodates, chlorates, ethylene oxide, hydrazoic acid, potassium oxide, dimethyl sulfoxide Page 3 of 4 CU4500 + trichloroacetic acid, hydrogen peroxide, sodium peroxide, sodium azide, sulfuric acid, hydrogen sulfide + air, and lead azide. Ignites on contact with chlorine, fluorine (above 121C), chlorine trifluoride, and hydrazinium nitrate (above 70C). Incompatible with 1-bromo-2-propyne, potassium dioxide, and actylenic compounds.
Hazardous decomposition products: Oxides of copper.

SECTION 11 : Toxicological information

Acute Toxicity:		
Oral:	7440-50-8	LD50, Rat 472mg/KG
Chronic Toxicity:		
Oral:	7440-50-8	Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has led to hemolytic anemia and accelerates arteriosclerosis.
Corrosion Irritation:		
Dermal:	7440-50-8	Dust is irritating to the respiratory tract. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		No additional information.
Mutagenicity:		Please refer to RTECS# BO9000000 for specific informaton.
Reproductive Toxicity:		Fertility: Post-implantation mortality, oral-rat TDLo=40mg/kg.

SECTION 12 : Ecological information

Ecotoxicity

Freshwater fish: 96 Hr LC50 Pimephales promelas: 0.0068 - 0.0156 mg/L; 96 Hr LC50 Pimephales promelas:

<0.3 mg/L [static]; 96 Hr LC50 Pimephales promelas: 0.2 mg/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 0.052 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 1.25 mg/L [static]; 96 Hr LC50 Cyprinus carpio: 0.3 mg/L [semi-static]; 96 Hr LC50 Cyprinus carpio: 0.8 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 0.112 mg/L [flow-through]

Water flea: 48 Hr EC50 Daphnia magna: 0.03 mg/L [Static]

Persistence and degradability: No information available.
Bioaccumulative potential: No information available.
Mobility in soil:
Other adverse effects: No information available.

SECTION 13 : Disposal considerations

Waste disposal recommendations:

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

SECTION 14 : Transport information

UN-Number

3089

UN proper shipping name

Metal Powder, Flammable, NOS (Copper Sulfate)

Transport hazard class(es)

Class:
4.1 Flammable solids, self-reactive substances and solid desensitized explosives

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

SECTION 15 : Regulatory information

United States (USA)

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

Acute, Chronic, Fire

SARA Section 313 (Specific toxic chemical listings):

None of the ingredients is listed

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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

7440-50-8 Copper Sulfate 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%):

None of the ingredients is listed

SECTION 16 : Other information

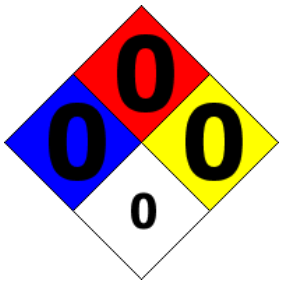
This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the 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:

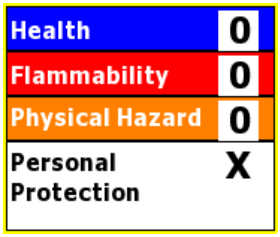
Abbreviations and acronyms:

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 : 03.02.2015
Last updated : 03.19.2015



NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 7440-47-3	Chromium	>98 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Loosen clothing as necessary and position individual in a comfortable position.Move exposed to fresh air. Give artificial respiration if necessary. If breathing is difficult give oxygen.Get medical assistance if cough or other symptoms appear.

After skin contact: Rinse/flush exposed skin gently using soap and water for 15-20 minutes.Seek medical advice if discomfort or irritation persists.

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. 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. Seek medical attention if irritation, discomfort or vomiting persists.Never give anything by mouth to an unconscious person.

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.Physician should treat symptomatically.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition. 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.Thermal decomposition can lead to release of irritating gases and vapors.

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.Use spark-proof tools and explosion-proof equipment.Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.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:

Wear protective equipment. Ensure that air-handling systems are operational.Ensure adequate ventilation.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13. Should not be released into environment.

Methods and material for containment and cleaning up:

Keep in suitable closed containers for disposal.Wear protective eyeware, gloves, and clothing. Refer to Section 8.Always obey local regulations.Evacuate personnel to safe areas.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Minimize dust generation and accumulation. Follow good hygiene procedures when handling chemical materials. Refer to Section 8.Avoid release to the environment.Do not eat, drink, smoke, or use personal products when handling chemical substances. Avoid contact with eyes, skin, and clothing.

Conditions for safe storage, including any incompatibilities:

Store away from incompatible materials.Protect from freezing and physical damage.Keep away from food and beverages.Provide ventilation for containers. Store in cool, dry conditions in well sealed containers. Store with like hazards

SECTION 8 : Exposure controls/personal protection

Control Parameters:	7440-47-3, Chromium, NIOSH REL: TWA 0.5 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.It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment.Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).Use under a fume hood

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:	Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).Safety glasses or goggles are appropriate eye protection.
General hygienic measures:	Perform routine housekeeping.Wash hands before breaks and at the end of work.Avoid contact with skin, eyes, and clothing.Before wearing wash contaminated clothing.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Silver-gray solid	**Explosion limit lower**: **Explosion limit upper**:	Not determined Not determined
Odor:	Not Determined	**Vapor pressure**:	Not determined
Odor threshold:	Not determined	**Vapor density**:	Negligible
pH-value:	Not Determined	**Relative density**:	Not determined
Melting/Freezing point:	1857.2°C (3374.96°F)	**Solubilities**:	insoluble
Boiling point/Boiling range:	2642°C (4787.6°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: 7.2 @ 28°C			

SECTION 10 : Stability and reactivity

Reactivity: Nonreactive under normal conditions.
Chemical stability: Stable under normal conditions.
Possible hazardous reactions: None under normal processing
Conditions to avoid: Incompatible Materials.
Incompatible materials: Strong acids.Strong bases.Oxidizing agents.
Hazardous decomposition products:

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

Toxicity to fish: LC50 - Cyprinus carpio (Carp) - 14.3 mg/l - 96 h

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

SECTION 13 : Disposal considerations

Waste disposal recommendations:

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

SECTION 14 : Transport information

UN-Number

3077

UN proper shipping name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chromium)

Transport hazard class(es)

Class:
9 Miscellaneous dangerous substances and articles

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

SECTION 15 : Regulatory information

Chromium, Reagent Grade,

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):

7440-47-3 Chromium: RQ 5000 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%):

7440-47-3 Chromium

Canadian NPRI Ingredient Disclosure list (limit 1%):

None of the ingredients is listed

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
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)
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

Effective date : 10.24.2014
Last updated : 03.19.2015

APPENDIX F

Quality Assurance/Quality Control Plan

175 Roger Avenue Commercial Development

175 Roger Avenue, Inwood, Nassau County, New York

NYSDEC BCP# C130164

QUALITY ASSURANCE PROJECT PLAN

Prepared for:
Inwood 175, LLC & AJM Capital II, LLC
New York, New York 10111

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

Fleming Engineering
158 West 29th Street, 9th Floor
New York, New York 10001

September 2020

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1.0 INTRODUCTION

The Quality Assurance Project Plan (QAPP) outlines the protocols and procedures that will be followed during field sampling at the 175 Roger Avenue site, located at 175 Roger Avenue, Inwood (Nassau County), NY, (hereafter referred to as the "Site"). The Site is part of the Brownfield Cleanup Program (BCP# C130164) administered by the New York State Department of Environmental Conservation (NYSDEC). A Site Location Map is included as Figure 1. A Site plan is included as figure 2. This QAPP has been prepared in order to ensure Quality Assurance (QA) and Quality Control (QC) for the environmental sampling activities which will be conducted during field sampling and to ensure the acquisition of defensible data.

2.0 PROJECT TEAM

The project team will consist of Fleming Engineering (FE) personnel and subcontractors. All field personnel and subcontractors will have completed a 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and the annual HAZWOPER 8-hour refresher in accordance with the Occupational Safety and Health Administration (OSHA) regulations and will have the training required for their respective duties as outlined for this work plan. The project team qualifications are provided in Attachment I.

2.1 Remedial Engineer

The oversight of all aspects of the project will be conducted by the Remedial Engineer (RE). The RE is responsible for compliance with the RAWP or current Site management document. Mr. Arnold F. Fleming, P.E., will act as the RE for any and all investigatory and remedial actions at the Site conducted as part of the BCP.

2.2 Project Director

The general oversight of all aspects of the project will be conducted by the Project Director. Tasks include coordinating with project manager and RE on decision-making throughout the project. Mr. Mark Hutson, PG will act as the Project Director for the remediation.

2.3 Project Manager

All components of the remedial action will be directed and coordinated by the Project Manager. The Project Manager will ensure a smooth flow of information between all parties involved in the remediation by communicating regularly with professionals from the New York State Department of Environmental Conservation (NYSDEC), the BCP Participant and their representatives, the remedial engineer, contractors, Site building owner/management and all members of the FE project team. Tasks will include the scheduling, budgeting, data management and decision-making for the field program. Mr. Steven Panter, CGWP, P.G., Senior Consultant will act as the Project Manager for the project.

2.4 Field Team Leader

Daily onsite sampling and health and safety activities will be supervised by a Field Team Leader. The Team Leader's responsibilities will include ensuring adherence to the RAWP and Health and Safety Plan (HASP) and regularly reporting daily progress and deviations from the RAWP to the Project Manager. FE will assign the role of Field Team Leader to appropriate FLS personnel.

2.5 Project Quality Assurance / Quality Control Officer

Adherence to the QAPP will be ensured by a FLS QA/QC Officer. Tasks will include reviewing the QA procedures with all personnel before any fieldwork is conducted onsite as well as completing periodic site visits in order to assess the implementation of these procedures. Mr. Joel Kane will act as the QA/QC officer for the remedial action.

2.6 Laboratory Quality Assurance / Quality Control Officer

Quality control procedures will be ensured by the selected laboratory, SGS, QA/QC officer. This officer will be responsible for the adherence to laboratory protocols, quality control procedures, and checks in the laboratory. The officer will track the movement of the samples from check-in to issue of the analytical results, conducting a final check on the analytical calculations. The laboratory groups performing the respective analyses will complete their own QA/QC and sign off on the data. The SGS QA/QC manual is attached to the end of this document.

3.0 LABORATORY PROCEDURES

3.1 Laboratory Methods

The sample container type, preservation, applicable holding time, and laboratory methods of analysis of the field samples have been included as Table 1. Holding times are based on the SW-846 analytical method which, when adjusted to account for an assumed 2-day sample shipping time, match NYSDEC Analytical Services Protocol (ASP) holding times. Sample analyses will be completed by a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH-ELAP) certified laboratory and reported as NYSDEC ASP Category B deliverables.

3.2 Quality Control Sampling

Additional analysis will be conducted for quality control assurance in addition to the laboratory analysis of the field soil and groundwater samples. Quality control samples will include: equipment rinsate blanks, duplicate samples, and trip blanks. The quantities of field samples and quality control samples have been summarized in Table 2.

The equipment blank and duplicate samples will be analyzed for the same parameters as the samples, as shown on Table 1.

4.0 STANDARD OPERATING PROCEDURES

The standard operating procedures for the soil sampling, groundwater sampling, and sampling equipment decontamination have been described in the following sections. Safety monitoring will be performed in accordance with the Site-specific HASP, which mandates that all field personnel wear the appropriate personal protective equipment (PPE).

4.1 Direct Push Soil Sampling

Soil sampling will be performed using 5-foot long acetate macro-core sleeves that will be advanced continuously to the desired depth below the ground surface. Soil samples will be screened continuously using a photoionization detector (PID) for organic vapors. Organic vapor screening will be performed by puncturing holes in the acetate liners or making a small slice in the soil column with a knife or sampling tool. The PID will then be inserted to collect a headspace reading for approximately 5-10 seconds. This procedure will be repeated at intervals along the soil column at the field scientist's discretion. The samples will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.)

Soil samples for laboratory analysis will be collected from the 6-inch interval most likely to be contaminated, based on PID readings, discoloration, staining, and the field scientist's judgement (field conditions may require longer that 6-inches to make a sufficient sample; however, this will be field based).

The samples will be collected by cutting the soil in two places. Soil samples for VOCs will be managed in accordance with EPA Method 5035 A – Closed System Purge-and-Trap and Extraction Procedure for Volatile Organics. A TerraCore and/or EnCore sampler will be used to collect at least 5 grams of soil and transfer carefully in laboratory provided and sealed vials. The entire sample vial will be placed, unopened, into the instrument by the laboratory to ensure minimal loss of volatile constituents.

Other samples can be collected using stainless steel or aluminum trowel, spoon or knife and homogenized (composite) in a decontaminated stainless-steel pan before placing in the sample bottles.

Samplers will wear phthalate-free gloves such as nitrile (no latex will be used). Only decontaminated, clean metal instruments will be allowed to touch the sample. If there is insufficient soil volume in the spoon, then this will be made up by attempting a second direct push sleeve at the same depth, or by using the next immediate sample interval above or below this depth, when appropriate. If there is no recovery, then the sample depth will be skipped, and drilling will progress to the next interval depth.

4.2 Remedial Excavation Sampling Procedures

Remedial excavations will be the primary means of cleanup. Remedial excavations may extend from two to 11 feet or more and may extend below the water table. Trenches greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

Soil samples collected at depths of three (3) feet or greater will be collected directly from the excavator bucket, at least 6 inches from the bucket sides to avoid cross-contamination. Samples will be collected from fresh bottom material, not from material that has washed in from the surrounding excavation.

Samples will be collected with a decontaminated sampling spoon, trowel, or TerraCore/EnCore sampler. Soil samples will be placed in stainless-steel bowl and/or Zip Lock bag and labeled with the proper sampling interval. To prevent VOC loss, VOC samples will be collected directly from the excavator bucket with a TerraCore/EnCore sampler. VOC samples will be collected from the unexposed soil approximately 6 inches into the bucket using a TerraCore/EnCore sampler ensuring minimal VOC loss from exposure. The remaining non-VOC samples will be collected from the sampling bowl or Zip Lock bag.

Removed soil will be observed and the presence and depth of stained soil, obvious chemical or petroleum odors emanating from the excavation, depth to groundwater (if encountered) and signs of a sheen on the water surface will be documented in the Field Book. Removed soils will be screened with a PID and recorded in the Field Book. The sample depth will be recorded

4.3 Monitoring Well Installation

Borings will be advanced to the desired depths by means of hollow stem augers and a truck-mounted or skid-mounted drill rig for the installation of monitoring wells. The monitoring wells will be constructed of two-inch diameter PVC in accordance with the following procedures:

- Using an oil/water interface probe, measure and record the depth to water in the open hole.

- Lower a PVC riser with a 10-foot to 15-foot length of PVC slotted screen to the bottom of the borehole. Approximately seven feet of the screen will be placed below the water table.

- If dense non-aqueous phase liquids (DNAPL) (such as tetrachloroethene) are suspected, a two-foot sump of steel casing will be attached to the bottom of the screen.

- The PVC screen slot size will be selected based on the sediment grain size observed in the soil. A slot opening of 0.020 inches will be chosen when medium to coarse sand is the dominant grain size. If silty sands or fine sand is dominant, then a 0.010-inch slot size will be chosen.

- In the annular space around the well screen, install the sand filter pack (about one to two feet above the top of the screen).

- For the one to two feet above the filter pack, a bentonite seal will be installed in the annular space.

- The remaining annular space will be filled with a bentonite-cement grout.

- Install a locking cap, flush-with-grade, curb box that has been set in cement. Set up a cement apron around the curb box to direct run-off away from the well.

- Decontaminate the hollow stem augers prior to and following each well installation

- Record data regarding the well installation in the field logbook and/or field data sheets (i.e., location, depth, construction details, water level measurements).

4.4 Groundwater Sampling

Groundwater samples will be collected from the monitoring wells applying the following procedures:

- If feasible, a headspace reading for vapor concentrations will be conducted. Prior to any sampling, remove the well plug slowly and measure the vapor concentrations within the well using a PID. In the instance a well is sealed and has dedicated through-tubing PID measurements will likely be infeasible.

- Measure depth-to-water using a water-level meter or an oil/water interface probe. For wells that do not have NAPL use a water level meter. For wells that historical had NAPL, measure depth to water using an oil/water interface probe to check for light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL). If NAPL is measurable, groundwater samples will not be collected as they are not representative.

- Connect a dedicated tubing to either a peristaltic or submersible pump and lower such that the intake of the pump is set at a mid-point of the water column within the screened interval of the well. The intake should be a minimum of 2-feet above the bottom of the well screen. Record the depth of the intake in the field notes. Connect the discharge end of the tubing to the flow-through cell of multi-

parameter (or equivalent) meter, such as a Horiba U-22. Connect the tubing to the output of the cell and place the discharge end of the tubing in a 5-gallon bucket.

- Low-flow purging and sampling will be implemented.

- Each monitoring well will be purged to ensure that a representative groundwater sample is obtained. Purge samples will be collected periodically (every 5 minutes) and analyzed for water-quality parameters (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity). Each well will be purged until the water-quality parameters stabilize (three successive readings) or three well volumes have been removed (see parameter stabilization criteria below). All purge water will be containerized in a 55-gallon drum.

Parameter	Stabilization Criteria
pH	+/- 0.1 pH units
Specific Conductance	+/- 3 % S /cm
ORP / Eh	+/- 10 mV
Turbidity	+/- 10 % NTUs (<50 NTUs)
Dissolved Oxygen	+/- 0.3 mg /L

- After purging is complete, the tubing to the flow through cell will be disconnected. The groundwater samples will be collected directly from the discharge end of the tubing into the required sample containers listed in Table 1. The containers will be labeled as described in Section 4.4.1 and stored in cooler with ice. The samples will be maintained at 4° +/- 2° C in the field and during transport.

- When the sampling is completed, the pump and tubing will be removed from the well.

- The pump, water-level meter and flow-through cell will be decontaminated as described in Section 4.5.

- All field measurements (depth-to-water, water-quality parameters), calculations (well volume) and observations will be recorded in the project logbook and on field data sheet.

4.4 Sample Handling

4.4.1 Sample Identification

All sample containers will be labeled with the following information:

- Project identification
- Sample identification

- Date and time of collection
- Analysis(es) to be performed
- Samplers initials

Collected and labeled samples will be placed in ice-filled coolers away from direct sunlight to await shipment/delivery to the laboratory. The samples will be maintained at 4° +/- 2° C in the field and during transport.

4.4.2 Sample Preservation

During the sampling day, samples collected will be preserved by placing the containers in coolers immediately after collection. At the end of the sampling day, all field samples that are to be shipped overnight will be packaged in coolers and shipped with the appropriate chain-of-custody (COC) forms. Prior to shipment each sample will be placed in a sealable plastic bag. A fresh bag of ice, or "blue ice" blocks will be placed into the cooler along with the chain of custody (COC) form. The samples may be shipped overnight (e.g., via Federal Express) or transported by a laboratory courier. Any coolers that are shipped to the laboratory will be sealed with tape and a COC seal to ensure that the coolers remain sealed during delivery.

Each of these coolers will also contain a temperature blank so that the receiving laboratory may verify sample temperature upon receipt.

Soil Samples

Soil samples will be placed in designated sample containers and EnCore samplers.

Groundwater samples collected

Groundwater samples will be collected and directly placed in laboratory prepared sample containers with appropriate preservatives. The analytical method for VOCs calls for the addition of preservatives to the vial prior to sampling. The preservative include hydrochloric acid (HCL).

4.4.2 Sample Custody

The field personnel will be responsible for maintaining the sample coolers in a secured area until arrival at the laboratory. Sample possession record from the time of obtainment in the field to the time of delivery to the laboratory or shipping off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; signatures of individuals involved in sample transfer; and the dates and times of transfers. The laboratory personnel will examine the custody seal's condition at sample check-in.

4.5 Decontamination Procedures

Decontamination will be performed on plastic sheeting or other containment area that is deemed to prevent runoff to the ground. Prior to use onsite and between sampling locations, pump, water-level meter and other non-disposable sampling equipment will be decontaminated using the following protocol:

1. Scrub using tap water /non-phosphate detergent mixture and bristle brush.
2. Rinse with tap water.
3. Repeat step 1 and 2.
4. Final rinse with distilled water.
5. Air-dry.

4.6 Field Instrumentation

All field instruments will be calibrated at the start of each day of field work in accordance with the manufacturer's specifications. In the instance that an instrument fails calibration, the Project Manager or QA/QC Officer must be contacted so as to arrange repairs or obtain a replacement instrument. A calibration log will be maintained onsite in the field book in order to record specific details regarding instrument calibration, including: dates, problems, and corrective actions. The PID will be zeroed with ambient air and calibrated with a standard of 100 parts per million (ppm) isobutylene each day, as per manufacturer specifications.

All field personnel will be trained in the proper operation of all field instruments at the start of the field program; however, instruction manuals for all equipment will be stored onsite as a reference of the proper procedures for operation, maintenance and calibration.

5.0 DOCUMENTATION AND RECORDS

5.1 Documentation Standards

This procedure will be used for all field activities regardless of purpose. These activities may include but are not limited to; all types of media (soil, soil vapor, groundwater)

sampling, GPR and all survey work, well installation, Site reconnaissance and inspection, remediation, OM&M tasks, and waste disposal and handling. The field personnel will keep an accurate written record of their daily activities in a bound field notebook sufficient to recreate the project activities without reliance on memory. All entries must be written in waterproof indelible ink. There should be no blank line. If only part of the page is used, the remainder of the page should have an "X" drawn across it.

5.2 Laboratory Data Packages

The samples collected will be sent to a NYS Environmental Laboratory Approval Program-certified laboratory for analysis and the summary data packages will be delivered in the New York State Analytical Services Protocol (NYSASP) - Category B which include the results, QC summaries, and all raw data. The full data package will contain all information required for validation.

5.3 Data Usability Summary Reports and Electronic Data Deliverable

As approved by NYSDEC, all data validation and generation of the Data Usability Summary Reports (DUSRs) will be completed by the FE in-house data validator. The purpose of the data usability review is to determine whether or not the data meets the Site-specific criteria for data quality and use. A Data Usability Summary Report (DUSR) will be prepared in accordance with NYSDEC DER-10 - Appendix 2B Guidance for Data Deliverables of Data Usability Summary Reports.

The data will be submitted to NYSDEC in an EQUIS Electronic Data Deliverable (EDD) format in accordance with Section 1.15 of NYSDEC's May 2010 *DER-10 Technical Guidance for Site Investigation and Remediation*.

Figures

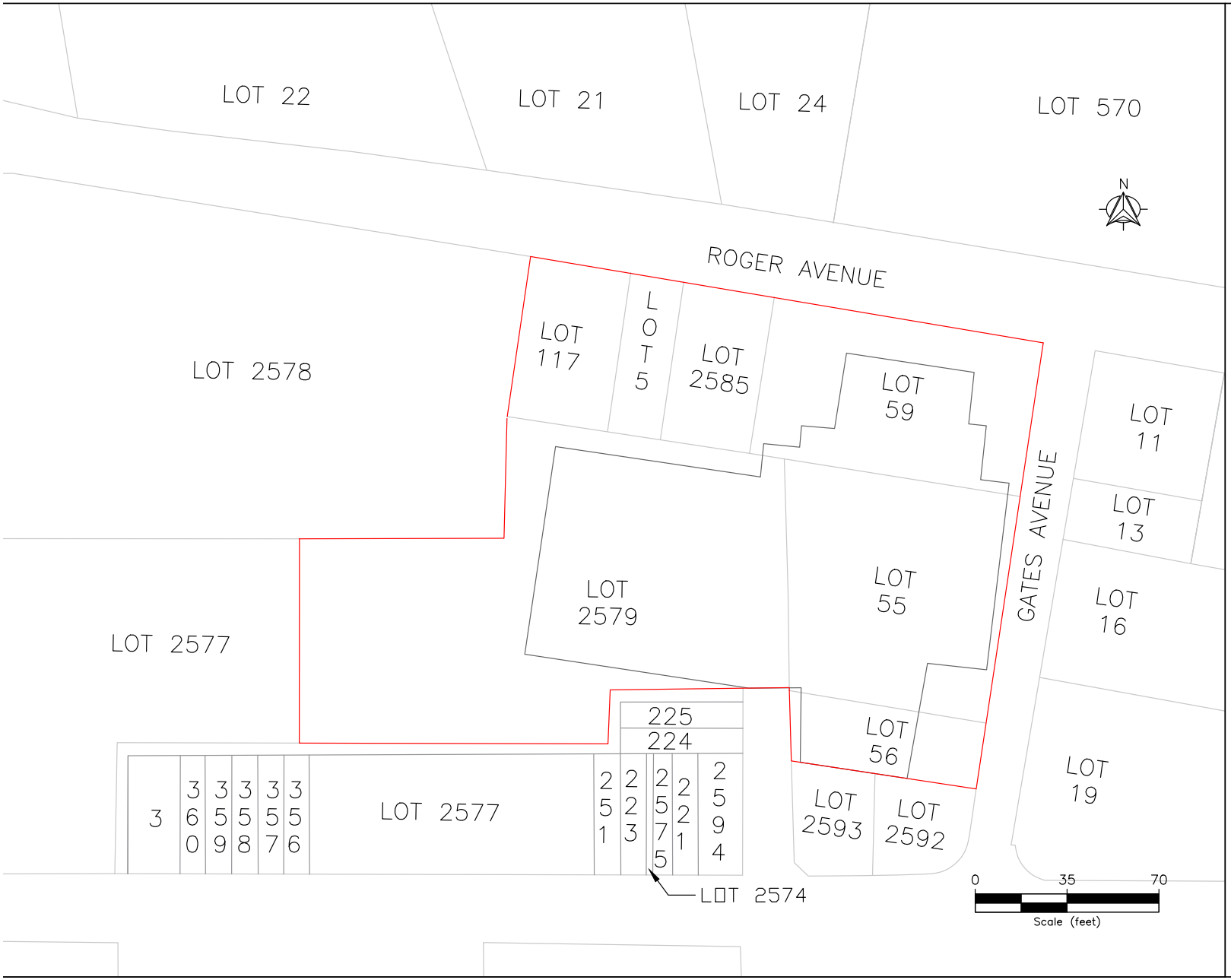
Far Rockaway & Lawrence 7.5' Quadrangles; published by the USGS, and obtained from National Map Viewer ©2020

FIGURE 1: SITE LOCATION MAP

Fleming Lee Shue

SITE: 175 Roger Ave.
Inwood, NY, 11096

CLIENT: AJM Capital, LLC



Fleming Lee Shue

Environmental Management & Consulting

158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, N, 11096

Figure 2

Site Plan

September 2020

Project Number
10188-017

LEGEND

- PROPERTY BOUNDARY
- BUILDING OUTLINE
- SITE BOUNDARY

Tables

Table 1
Summary of Analytical Methods
175 Roger Avenue
Inwood, New York

Sample Type	Sample Matrix	Analytical Parameter	No. of Samples[1]	Analytical Method	Sample Preservation	Holding Time[2]	Sample Container[3]
Grab	Soil	VOCs, TCL	TBD	SW-846 Method 8260B	Cool to 4° C; no headspace	14 days to analysis	(1) 60 mL. glass jar
Grab	Soil	Metals	TBD	Metals 6010D	Cool to 4° C; no headspace	NYSDEC technical requirements for hold time not established. 180 days for aqueous samples.	(1) 8 oz glass Jar
Grab	Soil	GRO	TBD	Method 8015D	Cool to 4° C; no headspace	14 days to analysis	((1) 8 oz glass Jar
Grab	Soil	TPH DRO	TBD	Method 8015D	Cool to 4° C; no headspace	14 days to analysis	(1) 8 oz glass Jar
Grab	Aqueous	VOCs, TCL	TBD	SW-846 Method 8260B	Cool to 4° C; no headspace, HCl, Ascorbic Acid	7 days to analysis	(3) 40mL VOA Vials
Grab	Aqueous	Metals	TBD	Metals 6010D	Cool to 4° C; Nitric Acid	180 days to analysis	(2) 500ml plastic
Grab	Aqueous	GRO	TBD	Method 8015D	Cool to 4° C; no headspace, HCl, Ascorbic Acid	14 days to analysis	(3) 40mL VOA Vials
Grab	Aqueous	TPH DRO	TBD	Method 8015D	Cool to 4° C	14 days to analysis	(1) 500ml Amber Glass
Trip Blank	Aqueous	VOCs, TCL	TBD	SW-846 Method 8260B	Cool to 4° C; no headspace, HCl	14 days to analysis	(2) 40mL VOA Vials
Equipment Blank	Aqueous	VOCs, TCL	TBD	SW-846 Method 8260B	Cool to 4° C; no headspace, HCl	14 days to analysis	(3) 40mL VOA Vials
Equipment Blank	Aqueous	VOCs, TCL	TBD	Metals 6010D	Cool to 4° C; Nitric Acid	180 days to analysis	(2) 500ml plastic

[1] Actual number of samples may vary depending on field conditions, sample material availability, and field observations

[2] From date of sample collection, based on SW-846 and consistent with NYSDEC ASP when assuming 2 days for sample shipping

TBD - To Be Determined

TCL – Target Compound List

Table 2
Summary of Quality Control Samples
175 Roger Avenue
Inwood, New York

Sample Type	Sample Matrix	Analytical Parameter	No. of QA/QC Samples
Trip Blank	Water	VOCs	1 per 20 samples
Field Duplicate	Soil, Water	VOCs; Metals	1 per 20 samples
Field Blank	Water	VOCs; Metals	1 per 20 samples

Attachment 1

Personnel Qualifications

Fleming Lee Shue

Environmental Management & Consulting

Arnold F. Fleming, PE
Owner

Education
- Bachelor of Science, Civil Engineering, Manhattan College (1968)
- Masters of Engineering, Manhattan College (1969)

Professional Registration
Professional Engineer, New York

General Expertise
Arnold F. Fleming is an environmental engineer with over 30 years of experience in the areas of water quality and planning studies, domestic and industrial wastewater treatment and disposal, environmental impact analysis, contaminated materials assessment and remediation, and environmental permitting. Mr. Fleming was one of the founders of Allee King Rosen & Fleming, Inc., AKRF, Inc., and AKRF Engineering P.C. For over 20 years, Mr. Fleming has provided these firms with engineering expertise in all technical areas relating to permitting and hazardous waste assessment and management and the assessment of impacts in these technical areas. Mr. Fleming has been Principal in charge for Phase II Environmental Assessments for over 100 residential, commercial and industrial sites in the Metropolitan New York area. Duties include design of sampling program, oversight of means and methods of sample collection, and preparation of final reports including recommendations for remediation. He has also been involved with the design for over 50 remediation systems including UST tank removals, contaminated soil disposal, soil vapor extraction systems, sparged air/ soil vapor extraction systems. Remedial designs include approximately 20 sites remediated under the State of New York Voluntary Clean-up program, and two sites on the Registry of Inactive Hazardous Waste Sites. Mr. Fleming has been the Principal in charge of the preparation of Phase I Environmental Assessments for several hundred residential, commercial and industrial properties, as well as several hospitals throughout the New York Metropolitan Area. He has been the Project manager for the preparation of 208 wastewater facility planning studies, and has prepared the infrastructure and utility assessments for over 100 EIS's in the Metropolitan New York Area.

PROJECT EXPERIENCE

535 West 23rd Street Development
Prepared the Phase I and asbestos surveys for this Manhattan development site. Designed the Phase II sampling program, executed the sampling and on the basis of the findings obtained approval to remediate an extensive oil spill via bio-remediation. The system was designed and installed under the new building with operation to begin upon occupancy of the building. The approach allowed the construction schedule to proceed without delay due to the discovered contamination.

Queens West Redevelopment
Technical representative to the Queens West Development Corporation (QWDC) a subsidiary to the Empire State Development Corporation charged with developing the 78 area redevelopment of the Hunters Point waterfront into a mixed commercial/residential development. Mr. Fleming developed a model remediation plan for the first residential building in 1995 and has applied this model to the next three residential development sites in Stage 1 of the development, the first having opened for residency in the summer of 2002. Mr. Fleming is assisting QWDC in selecting a developer for Stage 2 and 4 and is advising them on the remediation of Stage 2, a former oil refinery and paint factories. Development of Stage 2 is to occur simultaneous to the remediation efforts in the refinery portion of the site.

Staten Island Muss Site Redevelopment
Managed the initial Phase II sampling for this former industrial site re-zoned for single family residential development. The site was listed on the Registry of Inactive Hazardous Waste Sites. Prepared in Remedial Investigation and Feasibility Studied that led to a Record of Decision (ROD) setting forth the remediation for the site. Prepared the remedial Design to satisfy the ROD and managed the oversight of the remediation leading up to the removal of the site from the registry. Designed a revetment system to protect the capping material that was an integral part of the remediation from storm related erosion from the adjacent Raritan Bay. Petitioned the Federal Emergency Management Agency to remove the site from the 100-year flood plain on the basis of the new elevations and erosion measures implemented on the site.

Rego Park, Queens Remediation
Prepared a Voluntary Clean-up Application, performed additional sampling and developed a remedial work plan to remove solvent contaminated soils from this development site. Designed a sparged air/ Vapor Extraction System to remediated contaminated groundwater and site soils. Operated the system for two years reducing the groundwater contamination by over 90%. The sparged air / VES was designed to be installed under the building avoiding the delay of remediation the site prior to construction.

Hudson River Park Redevelopment
For this new park stretching from Battery Park City to 59th Street, Mr. Fleming oversaw the preparation of the US Army Corps of Engineers and the New York State Department of Environmental Conservation permit application s and responses to comments leading to issuance of this waterfront development permit. This permit was unique in that it addressed the first segment that was designed and ready to be built as well as the entire park for which no design was available. To address the future segments, schematic design drawings were submitted showing conceptual designs that would be refined as the park was designed and build. A permit condition to submit each segment design for review and determination of consistency with the master permit was included to assure that no impacts were introduced in the design process. If a determination on any segment were made that the design was not consistent with the master permit, a new permit process would be initiated.

Greenpoint Brooklyn Waterfront Development Planning
For a private developer, Mr. Fleming has prepared an evaluation of the permitting concerns including a jurisdictional assessment of the existing waterfront edge, to assist in the establishing of a development plan that will be compatible with the requirements of federal and state permits.

Queens West Redevelopment
Mr. Fleming led the permitting effort to allow redevelopment of the waters edge associated with this 78 acre mixed Commercial/Residential waterfront development. The project has three stages, the first under construction and permitted in 1995. Mr. Fleming managed the permitting effort for this first waterfront permit. The current application to the state and federal permitting agencies is for a project wide permit covering the remaining 3 stages of which 2 are under design. The final stage of the project was the subject to a schematic design only. Notable in the current permit is the reconstruction of collapsed platforms that are to become a site wide park and esplanade providing water access to this portion of the east river for the first time in over a century.

West Side Ferry Terminal
For the New York City Economic Development Corporation, Mr. Fleming led the permit effort to allow a new public ferry terminal located within the bounds of the Hudson River Park. Because the ferry terminal was not approved when the Park permit was issued, this project was carved out of the park permitting process and followed a separate permit track. The permit application was assembled using updated submissions from the Park permit application and addressed the specific concerns of the State and federal permitting

Jersey City Colgate Site Redevelopment
For this mixed commercial/residential waterfront redevelopment project, Mr. Fleming prepared the state Coastal Zone Development permit and a US army Corp of Engineers dredge and fill permit to allow a marina, esplanade and a new combined sewer manifold to be built. The sewer manifold was placed in the river because of space limitations and was permitted, the first fill permit in this portion of the Hudson River in 20 years.

River East Environmental Permits for Shoreline Protection
For this 10 acre site obtained the permits to install 500 feet of revetment to allow a 1.4 million square foot residential development on a former oil terminal. Also prepared the Remedial Action Work Plan to remove historic spilled oil simultaneous to Vernon Realty shoreline construction.

Fleming Lee Shue

Environmental Management & Consulting

Mark Hutson, PG
Associate

Education
BIS, Geological Sciences and Applied Biological Sciences, Arizona State University, Tempe, AZ

Certifications and Training
- OSHA 40-HAZWOPER Training
- OSHA 8-Hour Supervisor Training
- OSHA 10-Hour Construction Safety
- NYCOER Gold Certified Professional
- LIRR Roadway Worker Protection Training (2019)
- DOT Hazardous Waste Manifest Training (2019)

Professional Registrations
- Professional Geologist (License No. 001190-1) – New York State

GENERAL EXPERTISE

Mark Hutson is an Associate at Fleming-Lee Shue, Inc. with extensive experience in environmental consulting. Mark provides clients with innovative, cost effective strategies to manage their environmental liability and compliance issues. He oversees the firm's project portfolio as well as managing junior and senior level staff. His expertise include hazardous material assessments, environmental due diligence, site characterization, sub-surface investigations, soil and ground water remediation, remedial design and implementation, data management and interpretation, regulatory compliance and reporting, stakeholder management, cost to incident closure estimates and insurance claim investigations. He has considerable leadership and supervisory experience. Mark has worked on environmental projects in New York, New Jersey, Connecticut, Arizona, California and Nevada.

PROJECT EXPERIENCE

Queens Plaza Residential Development (QPRD), Long Island City, NY

Served as project manager for three separate Brownfield Cleanup Program sites associated with QPRD. Responsibilities included direct oversight and management of day to day field activities, implementation and execution of the remedial program, coordination with construction mangers, remedial contractors and several local and state agencies including NYSDEC, NYCOER, NYSDOH, and NYCTA. Remediation included the removal of over 115,000 tons of impacted soil, In-situ Soil Stabilization, NAPL recovery, collection of over

400 soil samples. Mr. Hutson's authority included directing all field efforts and acted as the primary contact for the project. Additional responsibilities included the coordination and preparation of all final reports including SMPs and FERs. QPRD received Certificates of Completion (COCs) for all three sites in August and September of 2016.

Inwood Rezoning, Manhattan, New York

Assessed presence of hazardous materials in soil and groundwater at projected and potential development sites identified in the Inwood Rezoning proposal over a 27-block area of Inwood neighborhoods in the Manhattan Borough of New York City. Composed the hazardous materials chapter of the Environmental Impact Statement and coordinated with NYC Economic Development Corporation to address revisions and comments.

Port Richmond Brownfield Opportunity Area Study, Staten Island, NY

Developed an inventory of and analysis of known and potential Brownfield Sites within the project boundaries. Prepared an environmental assessment including a review of past site use and potential for environmental impact for six strategic sites proposed for potential redevelopment. Assisted in the preparation of the Nomination Document pursuant to NYS Department of State (NYSDOS) guidelines and coordinated with NYSDOS to address revisions and comments.

Penn Station Access Project, NYC Metro Area

Evaluated the potential of hazardous materials in soil and/or groundwater throughout the proposed construction corridor for the Penn Station Access Project (approximately 15 miles) through a comprehensive review of historical property information as well as conducting site reconnaissance for properties of concern. Oversaw the preparation of the Hazardous Materials chapter included in the final Environmental Assessment Statement prepare for the Metropolitan Transit Authority.

Retail Petroleum/Bulk Storage Facilities Portfolio, New York

Served as project manager for numerous active and former retail petroleum facilities in varying lifecycle stages including site characterization, remedial design and implementation, and closure for a major petroleum client. Responsibilities included site characterization, scope development, remedial design and implementation, data management and interpretation, UST/AST removal, budget forecasting and management, regulatory compliance and reporting, and management of project teams and subcontractors.

Insurance Claim Investigation and Support, NY/NJ

Served as the regional lead and project manager for an international insurance company acting as environmental expert to assist the insurer in claim determinations. Responsibilities included claim investigation and technical support on projects associated with petroleum and industrial chemical releases, remediation, and UST removals in New York and New Jersey. Responsible for developing cost to incident closure estimates, determining what is reasonable and necessary regarding an insured's response to a claim, preparation of claim recommendations and reports including reviewing insured's invoices and invoice tracking.

Fleming-Lee Shue, Inc.

Former Retail Petroleum Facility Redevelopment, Brooklyn, NY

Served as project manager for the remediation and redevelopment of a former retail petroleum facility with a open NYSDEC spill number. Remediation of the underlying soil and groundwater occurred simultaneously with the construction of a 12-story multi-use building. Remediation included the excavation of contaminated soil to 15 feet bgs followed by In Situ Chemical Oxidation of residual soil and ground water impacts. Project required interface with and coordination of numerous stakeholders and regulatory agencies including the NYSDEC, NYCOER, NYCDEP, NYCTA and NYCDOB.

Soil Vapor Intrusion Investigation, Brooklyn, NY

Served as project manager for a large soil vapor intrusion investigation of a former retail petroleum facility now a PETCO retail store. Responsible for the development and execution of a sampling plan in compliance with NYSDOH/EPA guidelines which included the installation of numerous subsurface soil vapor sampling points and indoor/outdoor sampling of ambient air conditions to determine potential exposure scenarios.

Commingled Plume Investigation/Remediation, Blythe, CA

Acted as field geologist/environmental scientist for a public municipality client responsible for a commingled gasoline/diesel plume emanating from multiple sources. Responsibilities included plume characterization, site investigation, remedial design, implementation and operation, permitting, data collection and analysis, and waste management. Oversaw the installation of five multi-phase extraction (MPE) systems and was responsible for the operation, maintenance and optimization of the MPE systems operating simultaneously.

Various Environmental Sites, AZ/CA/NV

Served as lead environmental scientist/field geologist for numerous environmental remediation sites throughout Arizona, Southern California and Nevada. Responsibilities included site characterization, sub-surface investigations, sampling of environmental media, data analysis and interpretation report preparation, and oversight of remedial contractors.

Fleming Lee Shue

Environmental Management & Consulting

Steven E. Panter, CGWP, PG

Education

- GIS Training, Penn State University, ongoing
- Master of Science, Environmental Engineering, Concentration in Hydrogeology New Jersey Institute of Technology (1990)
- Graduate Studies, Soil Sciences, Rutgers University (1979)
- Bachelor of Science, Forest Science, University of Wisconsin (1978)

Certifications/Training

- OSHA 40-Hour HAZWOPER Training
- OSHA 8-Hour Supervisor Training
- Fracture Trace and Lineament Analysis, April 1995
- Intensive training course in identifying fractures and lineaments in rocks of Pennsylvania.
- The course emphasized the importance of identifying these features in order to assess and understand ground water movement and to understand contaminant migration in geologic settings where these features can play a key role.
- Treatment Technology for Contaminated Soils and Ground Water, February 1995.
- Assessment, Control and Remediation of LNAPL Contaminated Sites, October 1994.
- Ground Water Flow through Fractured Media, University of Wisconsin, 1993.
- Hydrogeology of the Glacial Deposits of New Jersey: An Applied Field Course, presented by Cook College in Cooperation with Rutgers University, 1993.
- Design and Analysis of Aquifer Pumping Tests - Association of Ground Water Scientists and Engineers, Dublin, Ohio, 1991.

Professional Registrations

- Certified Ground Water Professional (CGWP No. 437) by the National Ground Water. Association (NGWA), June 1993
- Professional Geologist – New York State

General Expertise

Steven Panter is a Hydrogeologist with over 30 years of experience in environmental consulting. Mr. Panter has supervised or played a key technical role in many soil and ground water investigations involving investigations and remediation of fuel oil, PCE, TCE, polychlorinated biphenyls (PCBs), cumene, gasoline, organic compounds, metals, dioxins, and coal tar. They have been performed for landfills, chemical processing plants, underground storage tanks (UST), fuel oil terminals, manufacturing plants and power production facilities. The clients have been primarily large corporations, utilities, or municipalities, although some work has been done for small businesses. He is responsible for projects that range from less than $20K to more than $20,000,000. Mr. Panter has developed sampling and analysis programs for a variety of ground water and

subsurface soil investigations. His expertise also extends to technical oversight and legal support; and environmental auditing. Mr. Panter also has worked on environmental impact statements for several proposed power plant facilities and power plant upgrades in New York State.

He has extensive experience in New York State Brownfield Cleanup Program projects. Mr. Panter has directed or played a key technical role in a number of Brownfield projects involving the investigation and remediation of petroleum and coal tar contaminated media.

PROJECT EXPERIENCE

Queens Plaza Residential Development

Mr. Panter was one of the key senior staff and the technical lead for the Brownfield remediation of a highly contaminated three-acre, parcel in New York City. The total project monetary size was 875 million dollars. The former chemical plant was incorporated into three separate Brownfield sites that required multiple investigations, remedial investigation reports, and remedial action work plans. Mr. Panter was the principal author of these reports and responsible for meeting deadlines to ensure that financing for the project remained in place. He coordinated major aspects of the project and represented the client in meetings with state officials, attorneys, insurance companies and other critical parties. Ultimately, the site successfully met the Brownfield goals and received Certificates of Completion (COC) for all three parcels allowing development to move forward. Very large tax credits then became available to the client as a result of receiving the COCs.

Queens West Parcel 8 Remediation

Mr. Panter oversaw and directed the investigation of a Brownfield Cleanup Program site contaminated with 80,000 pounds of coal tar waste. He developed an innovative *in situ* remediation approach, RemMetrik®, which eliminated excavation and saved the client $7 to $9 million dollars in cleanup costs and eliminated community exposure. The treatment focused on oxidation of 47,000 pounds of coal tar contaminant in the treatment interval. This was the first remediation of its kind in New York State. NYSDEC approved the results and issued a Certificate of Completion within 14 months of the beginning of cleanup. Treatment lasted five months in one application.

Queens West Center Boulevard Remediation

Mr. Panter oversaw and directed the investigation of a Voluntary Cleanup Site contaminated with 18,500 pounds of coal tar waste. He developed an innovative *in situ* remediation approach, RemMetrik®, which eliminated excavation of the street and disruption to the community and eliminated public exposure. This was the second remediation of its kind in New York State. NYSDEC review is ongoing. Treatment lasted two months in one application.

Queens West Redevelopment

Mr. Panter oversees environmental compliance for a very large scale redevelopment of the New York City waterfront, and entails remediation of numerous parcels of former

industrial waterfront that are heavily contaminated with petroleum, coal tar, and numerous other wastes. The site will be redeveloped into commercial and residential space with parks and green spaces. Mr. Panter advises QWDC on all aspects of environmental compliance, contaminated site investigation, hazardous materials management, and remediation.

Long Island City, Queens, New York Redevelopment
Mr. Panter prepared a detailed assessment of soil disposal options and costs for a facility contaminated with creosote and metals. He used a statistical analysis approach to advise the client on the most cost effective means of selecting soil disposal options depending on the type and degree of soil contamination.

West 23rd Street 10th Avenue Redevelopment
On a site contaminated with gasoline and fuel oil, Mr. Panter prepared an analysis differentiating the sources of on-site and off-site contamination in order to justify closing the spill number. This was a multivariate analysis demonstrating that the on-site contamination was clearly different from the off-site contamination. What was unique about the analysis is that conventional reporting of results did not distinguish between the different sources, but the multivariate analysis—using the same data—showed a distinct difference.

West 30th Street and 11th Avenue Redevelopment
On a site contaminated with metals near a former coal gas plant slated for a major residential development, Mr. Panter analyzed groundwater issues stemming from benzene contamination and successfully predicted contaminant plume behavior during dewatering. He developed an indoor air monitoring program for a neighboring residential building as a protective measure against inducing contamination to residents. He also presented data supporting the case that chromium levels were the result of natural conditions rather than contamination.

Gansevoort Street to West 23rd Street; The High Line
Mr. Panter managed the waste characterization portion of the High Line project in New York City, where a defunct elevated industrial railway is being converted into a major urban park and green space. Mr. Panter directed testing, removal, and management of contaminated track ballast and was a key individual in planning waste management for all track bed materials. He was responsible for directing and planning inspections for hazardous materials throughout the entire program and also directed air sampling and monitoring for the construction phase.

Astoria, Queens, NY Astoria Gas Turbines Well Reconnaissance Program
Mr. Panter managed a well reconnaissance program at the Astoria Gas Turbine facility to assist the development of a remediation program to close out petroleum spills inherited from the previous site owner. The program encompassed evaluation of more than 70 monitoring wells, groundwater and product level measurements, groundwater sampling, a summary of the findings, and recommendations for improving the monitoring network and resolving ambiguities in the well information. Mr. Panter effectively coordinated meetings between station representatives, off-site NRG managers, and an independent project manager working for NRG. He also facilitated very productive meetings between

the previous site owner and NRG in order to obtain additional well information and secure permission to access wells in off-site, adjacent areas.

Staten Island, NRG Arthur Kill Generating Station, Staten Island Ignition Oil Area Recovery Program
Mr. Panter has been assisting NRG at the Arthur Kill Generating Station with a product recovery/monitoring in the Ignition Oil Area. This effort entails monthly monitoring, recovery, and reporting of product levels in five recovery wells installed by a consulting firm when the plant belonged to Con Edison. At NRG's request, the program was recently extended. Station personnel often call the Mr. Panter to discuss other environmental matters because of his extensive site knowledge and excellent rapport with the Station managers and staff.

Staten Island, Transformer Explosion Remediation Program
Following a transformer fire and rupture that released PCBs in concentrations exceeding 300,000 ppm, Mr. Panter managed a major remediation program encompassing massive interior and exterior portions of the power plant including soils, pavement, and walls. This was done under a Consent Order and had potential penalties of $500,000,000. Mr. Panter oversaw and directed all aspects of the field program and represented Con Edison at numerous meetings with regulatory personnel. This portion of the remedial program lasted one year.

Staten Island, Property Sale Site Assessment
Project manager for a large-scale expedited site assessment of the Arthur Kill Generating Station as part of the property sale to Visy Paper Company and the New York City Economic Development Corporation. Directed, planned, and coordinated the investigation. Played a critical role in numerous meetings with representatives of the New York State Department of Environmental Conservation (NYSDEC) from the Acting Regional Director and Director of Hazardous Waste to NYSDEC field staff. Rapidly and thoroughly completed the site investigation and remedial assessment to a level whereby the findings and recommendations were easily accepted by NYSDEC. Acceptance of results and remedial strategies was facilitated by the excellent rapport with NYSDEC representatives.

All Boroughs, Site Investigation, New York City Housing Authority
Supervised and coordinated the investigation of 20 housing project sites with leaking USTs and pipelines for the New York City Housing Authority. Provided client contact, prepared work plans, supervised field programs, interpreted and analyzed data, and prepared final reports and recommendations. The focus of the program was to characterize and delineate the extent of oil-contaminated soils and ground water contamination, prior to remediation. Program included installation of monitoring wells and interpretation of soil and ground water contamination in a variety of geologic settings throughout the five boroughs including marine deposits, bedrock, glacial outwash and till.

Manhattan and Brooklyn, Environmental Assessment, New York City School Construction Authority
Project Manager for an environmental assessment of three properties proposed for an elementary and two middle schools in New York City. Directed technical and

administrative aspects of the project. Program consisted of installation of deep monitoring wells in glacial outwash deposits and evaluation of ground water flow and quality.

Environmental Assessment, New York City Economic Development Corporation.
Managed environmental assessments of two NYC-owned properties slated for commercial development. Directed technical aspects of the project including soil gas testing and monitoring well installation and sampling.

All Boroughs, Site Investigations, New York City Housing Authority
Supervised the investigation of 20 sites with leaking USTs for the New York City Housing Authority.

Fuel Oil Terminal Demolition, Paragon Cable Company/Rucci Oil Company
Oversaw the demolition of two fuel oil terminals in NYC. Prepared a remedial action and sampling plan to expedite the cleanup process and comply with New York State Department of Environmental Conservation regulations. Supervised and directed the activities of several contractors with field crews of 10 to 20 people. Advised corporate principals on project progress, issues and alternatives. Met with regulatory officials on behalf of the client. One facility contained more than 18 large aboveground and underground fuel oil tanks. Total storage capacity was 2.3 million gallons. The second facility had seven underground storage tanks and one aboveground tank. Total storage capacity was 385,000 gallons.

Rockaway (NJ) Borough Superfund Site Ground Water Investigation Program
Developed a ground water investigation program for a buried glacial aquifer system in northern New Jersey. Designed the investigation to examine the effect of TCE contamination on a local aquifer. The program consisted of a network of shallow, deep and intermediate level monitoring wells and associated ground water sampling.

All Boroughs, Ground Water and Soil Sampling, New York City Housing Authority
Developed a ground water and soils sampling program to assess fuel oil contamination at approximately 20 New York City Housing Authority sites.

Site Investigation, New York City School Construction Authority
Conducted site investigations of soils and ground water in Manhattan and Brooklyn.

Soil Sampling Program, Paragon Cable/Rucci Oil Company
Conducted a soil sampling program as part of the demolition of two fuel oil terminals in NYC. The program included the sampling of waste soil piles and the excavations.

Expert Witness Testimony and Report Preparation
Mr. Panter testified as an expert witness as part of a technical panel before the New York State Board of Public Utilities as part of a power plant siting hearing. In this capacity, Mr. Panter was cross-examined on his written testimony by a panel of attorney's on the side of the opposition. He testified on technical matters involving hazardous materials and contamination of soil and groundwater and the impacts to the community depending on the project. Mr. Panter also served as a fact expert for a New York State agency in a

contamination lawsuit against a Fortune 100 company. Mr. Panter was deposed as part of this case. He drafted and corroborated on two expert reports prepared and prepared counter arguments for the case. The case had a successful outcome for the client.

Publications

Mr. Panter has authored numerous technical papers on site investigation and remediation and has given technical presentations on these topics and on effective presentation of technical information.

Fleming Lee Shue

Environmental Management & Consulting

Joel Kane
Project Manager/Environmental Scientist

Education
- B.S. Biology, minors in Chemistry; English, Gonzaga University (2013)

Certifications and Training
- OSHA 40-Hour HAZWOPER Training
- 10-Hour Construction Safety and Health Training
- SWPPP Inspector/Administrator
- Optical Gas Thermographer
- 8-Hour NORM Surveyor

General Expertise

Joel Kane is an Environmental Scientist with Fleming Lee-Shue, Inc. Mr. Kane has been involved with remedial investigations, monitoring & sampling and the design, set-up and maintenance of various remedial systems. Mr. Kane possesses over four years' experience in assessing the presence of hazardous materials through the evaluation of site conditions and developing remedial alternatives. He is experienced conducting Phase I and Phase II Environmental Site Assessments to support property transactions, pre-design investigations, hazardous soil and waste classification, construction oversight and lab coordination. Mr. Kane has conducted numerous subsurface investigations and is accomplished in sample collection of all environmental media. Mr. Kane has experience in large parcel Oil & Gas site remediation and reclamation, contractor oversight, major oil spill response, in addition to developing long term compliance programs (i.e. air monitoring, NORM, etc). Mr. Kane has practical lab experience in bench chemistry, organic chemistry, GCMS analyses, soil chemistry consulting, and data validation. He maintains a proficient understanding of NYSDEC, NYCOER, NJDEP regulations and has participated in the redevelopment of various Sites in the Brownfield Cleanup Program (BCP) for NYSDEC, and the Voluntary Cleanup Program (VCP) for the NYCOER. Mr. Kane maintains a track record of excellence, regularly managing the quality assurance of subcontractors and ensuring that client scope requirements are met on every project.

PROJECT EXPERIENCE

Penn Station Access Project, NYC Metro Area
Evaluated the potential of hazardous materials in groundwater, soil and soil vapor throughout the proposed construction corridor for the Penn Station Access Project (approximately 15 miles) through a comprehensive review of historical property

information, environmental databases entries and the site reconnaissance of key properties of concern. Prepared the Hazardous Materials chapter included in the final Environmental Assessment Statement prepared for the Metropolitan Transit Authority.

Phase I Environmental Site Assessments
Performed over 75 Phase I Environmental Site Assessments including due diligence evaluations. Past assessments vary from single home residential properties to large parcel Brownfield Cleanup Program sites. Investigated the potential impacts to the sites and used expertise to summarize any existing recognized environmental conditions based on review of historical records, environmental database listings, site inspection, and interviews with former owners.

Phase II Environmental Site Assessments
Performed over 15 Phase II Environmental Site Assessment as a part of real estate transactions. Former sites include residential, industrial, auto shops, large parcel agricultural sites, oil development sites, crude oil terminals, hydro-fracking sites, and gas plants. Performed soil, groundwater, oil sludge, and soil vapor sampling on the various sites. Evaluated analytical data and prepared Phase II assessment of onsite contamination.

Remedial Site Investigations for Spills – Manhattan, NY
Performed a Remedial Site Investigation for a petroleum spill associated with a underground storage tank in Manhattan, NY. Performed drilling oversight and conducted soil and groundwater sampling on the site. Evaluated analytical data and prepared report assessment of onsite contamination.

Brownfield Cleanup Site – Former Stapler Manufacturer, Long Island City, NY
Oversaw the implementation of CAMP, operation and maintenance on soil vapor extraction system and Electrical Resistance Heating remedial technologies implemented at site. Conducted soil, soil vapor, waste characterization and groundwater sampling investigations onsite. Developed site conceptual model including evaluating remedial alternatives and delineating contaminant plume characterization. Assisted in development and oversight of *in situ* bioremediation injection on Site. Prepared daily reports, generated data management tools, and managed inventory of generated waste onsite.

Brownfield Cleanup Site – Former Chemical Factory, Long Island City, NY
Performed drilling oversight and operation and maintenance on capture well treatment system at heavily contaminated NYS Brownfield Cleanup Site. Conducted waste characterization and groundwater sampling investigations onsite. Monitored sub-slab depressurization system functionality onsite. Prepared reports and managed inventory of generate waste onsite.

Petroleum Spill Response, Remediation and Closure – MT, ND, SD, WY
Performed over 100 petroleum release and spill response remedial investigations at oil and gas facilities. Projects include ruptured treatment equipment, oil well misting, pipeline releases, leaking UST removal, and oil truck accidents. Responsibilities include excavation oversight, sample field screening, end-point confirmation sampling, analytical interpretation, remedial alternatives analysis, report preparation, and spill closure.

Fleming-Lee Shue, Inc.

Environmental Due Diligence – Raven Oilfield Acquisition, Williston, ND
Conducted massive environmental due diligence for acquisition of an entire oil field in Northern North Dakota. Evaluated the potential for hazardous materials in groundwater, soil and soil vapor at over 200 individual oil and gas development Sites. Including comprehensive review of spill records, historical development records, and local, state and federal databases. Managed team of scientists and conducted site reconnaissance at all 200 locations and developed comprehensive report within required turnaround time (two weeks).

Former Gas Plant Remediation – Everton, WY
Served as lead chemist and scientist on remedial alternatives analyses for a former sour gas plant in western Wyoming. Organized remedial investigation, evaluated laboratory analytical data and developed alternatives analyses for reclamation of the site, including *in-situ* treatment. Responsibilities included data interpretation, chemical alternative predictive modeling, remediation oversight, contractor oversight, and final report writing.

Oil Contaminated Soil Landfarm – Bairoil, WY
Served as lead consultant on reclamation of a former landfarm contaminated waste site. Organized remedial investigation, evaluated laboratory analytical data and developed site conceptual models and remedial alternatives for reclamation of the site, including the possibility for *in-situ* treatment. Responsibilities included data interpretation, chemical alternative prediction modeling, and final report writing.

Waste Oil Injection Plants– Gillette, WY
Served as lead consultant on reclamation of a three (3) former waste oil injection plant contaminated waste sites. Organized remedial investigation, evaluated laboratory analytical data and developed site conceptual models and remedial alternatives for reclamation of the site, including the possibility for *in-situ* treatment. Responsibilities included data interpretation, chemical alternative prediction modeling, and final report writing.

Stream Infrastructure Restoration Projects– Sweet Grass County, MT
Responsible for reviewing and providing construction oversight of stream infrastructure rehabilitation projects located on the Boulder River, MT. Project objectives include completing a geomorphologic and hydrologic analysis of the river near the headgate location to improve diversion efficiency to the headgate and minimize impacts to the stream and fisheries. Responsibilities included preparing a grant application, project management, and construction oversight.

Baseline Water Quality Sampling— Bakken Oil Field, ND
Responsible for project management of groundwater sampling programs for multiple oil and gas companies simultaneously. Responsibilities included constructing database of private groundwater wells, developing a Sampling and Analysis Plan (SAP), coordinating site access and scheduling, sampling groundwater wells, and developing data summary reports.

APPENDIX G

Storm Water Pollution
Prevention Plan

175 Roger Avenue Commercial Development
Brownfield Cleanup Program Site No. C130164

Section 40; Block L: Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

STORM WATER POLLUTION PREVENTION PLAN

Prepared for

Inwood 175, LLC & AJM Capital II, LLC
New York, New York 10111

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

Prepared by

Fleming Engineering
158 West 29th Street
New York, New York 10001

September 2020

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APPENDIX

Appendix A Certification of Storm water Pollution Prevention Plan and Prime Contractor/Sub-Contractor Certification

1.0 INTRODUCTION

1.1 PURPOSE OF STORM WATER POLLUTION PREVENTION PLAN

This Stormwater Pollution Prevention Plan (SWPPP) was prepared by Fleming Engineering (FE) to address conditions as specified in the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001). The SWPPP was developed according to the current New York State Storm Water Management Design Manual and the New York Standards and Specifications for Erosion and Sediment Control. The SWPPP describes the measures for controlling runoff and pollutants during the implementation of the proposed soil remediation of the 175 Roger Avenue Commercial Development Site (the "Brownfield Site").

The Brownfield Site is in the NYSDEC Brownfield Cleanup Program (C130164). Inwood 175, LLC & AJM Capital II, LLC is a the BCP Volunteer. The Brownfield Site remediation will be conducted in accordance with Remedial Action Work Plan (RAWP). The objectives of the SWPPP include the following:

- Reduction and minimization of erosion during and after remediation and sediment loading of storm water entering or exiting the Brownfield Site during remediation activities
- Control and reduction of storm water entering the Brownfield Site during excavation and remediation
- Control of the volume and peak rate of runoff during and after remediation
- Maintenance of storm water controls before, during and after remediation.

In order to comply with the SPDES General Permit for storm water Discharges from Construction Activity Permit, the SWPPP identifies potential pollution sources that could affect the quality of storm water discharges during remediation. The SWPPP also identifies controls and practices that will be used during and after remediation to minimize runoff, reduce pollutants in discharges, and establish compliance with terms and conditions of the SPDES permit.

The storm water pollution prevention devices and practices described in this document and in the remediation documents will provide effective attenuation and removal of sediments and pollutants in storm water runoff during remediation at the Brownfield Site.

The improvements are designed to control the rate, the volume, and the sediment/pollutant loading of storm water discharges during and after the proposed remediation. Proper implementation of this SWPPP will result in compliance with the provisions of the General Permit GP-0-10-001.

1.2 IMPLEMENTATION OF STORM WATER POLLUTION PREVENTION PLAN

The Contractor will be responsible for complying with all conditions and requirements of this SWPPP, in addition to the conditions of the General Permit GP-0-10-001. The Contractor shall keep all remediation activities under surveillance, management and control to avoid pollution of surface waters and groundwater. The Contractor will be required to submit a Method of Erosion Control and a final Site-specific Erosion and Sediment Control Plan. The Contractor will be required to initiate and maintain erosion controls before and during remediation to prevent siltation of any affected collection basins, manholes, channels, combined sewers, storm sewers, down gradient properties, or receiving waters, as well as any public right-of-ways. In the event that the temporary controls implemented by the Contractor prove to be ineffective or inadequate in controlling sediment and erosion at the Brownfield Site or otherwise unacceptable, the SWPPP will be modified accordingly and the Contractor will then be required to make the appropriate modifications or additions at the remediation site. Furthermore, if a new Contractor or Subcontractor assumes responsibility for implementing any portion of the SWPPP or if there is a significant change in design, remediation, operation or maintenance that was not considered or addressed in the SWPPP, the SWPPP shall be revised to include the relevant information and controls. If significant changes are made, the revised SWPPP will be certified and resubmitted to the NYSDEC for review and approval.

1.3 PROJECT DURATION

Remediation is anticipated to take two to four months to complete.

2.0 PROJECT DESCRIPTION

2.1 PRE-REMEDIATION SITE CONDITIONS

The Brownfield Site is in the Brownfield Cleanup Program (BCP) and is listed as BCP Site No. C130164 (the Site). LIC Development Owner, L.P. (the "BCP Volunteer") is a contract vendee and the BCP Applicant. The Site occupies 155,074 ft^2 (3.56 acres) and the Site is currently vacant. The area is zone industrial.

The property is located at 175 Roger Avenue Hamlet of Inwood, Town of Hempstead, County of Nassau, State of New York (Site). The Site consists of eight irregular-shaped tax lots (Section 40; Block L; Lots 5, 55, 56, 57, 59, 117, 2579, and 2585 on the Nassau County Land & Tax Map). Roger Avenue borders the Site on the north, Gates Avenue fronts the east, residential buildings and Bayview Avenue lie to the south, and Expeditors Freight Service borders the Site on the west. Figure 1 presents a Site Location Map and Figure 2 presents a Site Plan. Historically, the property housed an auto shop, metal fabrication shops, and office and warehousing space.

The immediately adjoining properties are a mix of commercial and residential uses. Roger Avenue borders the Site to the north and a parking lot and former Eastern Shell terminal is located further to the northwest. A gravel/soil recycling facility and a Sony Pictures Entertainment building is located northeast of the Site. The Site is bordered by Gates Avenue to the east and D. Daniels Sanitation and MGR Equipment Corporation are located further east across Gates Avenue. Adjoining the Site to the south are several residential properties and adjoining the Site immediately west is Expeditors Freight Service.

2.1.1 Drainage

The Site is drained by a number of dry wells on the western portion of the property. The Site is paved with concrete/asphalt, and there is no storm water infiltration.

2.1.2 Geology and Hydrogeology

The Site is located on level land with a surface elevation of approximately 8.5 feet relative to the North American Vertical Datum 88 (NAVD88). The generalized subsurface profile consists of sands, silty sand, and clay and silt strata. The soils generally become finer with depth.

Groundwater occurs within five feet of the surface. The groundwater table, which fluctuates seasonally in response to precipitation, is negligibly influenced by tidal action. Groundwater flow direction is predominantly to the south, with a smaller component to the north. There is a groundwater divide on Site. Figure 3 shows the direction of groundwater flow on the Site.

No surface water bodies exist on Site. The closest surface water body is Jamaica Bay located approximately 600 feet north of the Brownfield Site and 1,000 feet south of the Site.

2.1.3 Results of Previous Investigations

A previous environmental investigation performed by Fleming Engineering found Tetrachloroethene (PCE) and Trichloroethene (TCE) as the primary contaminants in groundwater. Locally, xylenes impact groundwater in the UST Area. Metals impact the dry wells.

2.2 REMEDIAL MEASURE WORK PLAN

The elements of the proposed remediation for the Brownfield Site will be implemented during remediation. The remediation will be phased so as to minimize the exposure of soils underneath the current building slab and prevent sediment and pollutant runoff from occurring.

2.2.1 Remediation Phasing

The Remedial Action will consist of the following elements:

- Installation of site perimeter berm, shallow excavation, or silt fence
- Installation of stabilized remediation entrance
- Set up containment/internal berm for soil stockpile drainage
- Remedial excavation
- Remove concrete slab
- Install FEMA/protective cap fill

2.2.2 Excavation

The method is to wet excavate (excavate without dewatering) soil (and debris) and place it on a lined, hardened surface and collect drainage before loading soil into trucks for disposal at off-Site facilities. Soils will be removed from the UST Area and dry wells using appropriate or otherwise suitable excavation equipment. Other areas may be subject to identical soil removal methods.

2.2.3 Dewatering

Dewatering, if necessary, will be used only as necessary to complete the work and excavate to the desired depths. Water will be pumped from the excavation to baker tanks, or equivalent, staged inside the Site. All water will be disposed by licensed haulers to permitted disposal facilities. No dewatering liquids will be discharged back into the excavation.

3.0 PROPOSED STORM DRAINAGE CONDITIONS

Existing Conditions

The Brownfield Site is currently served by a sanitary sewer, but there are no apparent storm water inlets adjacent to or on the Site.

Remediation

The anticipated storm water control and remediation sequencing at the Site is described below. If changes are made to the remediation sequencing, the SWPPP will be adapted as necessary.

1. A berm and/or a shallow trench will be excavated along the Site perimeter to bring the Site elevation below sidewalk/street elevation, preventing storm water from leaving the Brownfield Site. If necessary, during this process, storm water will be collected on-Site and pumped into a baker tank, and then allowed to slowly drain onto the Site.
2. Stabilized pads will be installed at each vehicle access point. These locations will be determined by the Contractor.
3. Site remediation activities will be completed, including excavation of contaminated soil, transportation of contaminated soil from the Site, and backfilling of the disturbed area as necessary to support the proposed building foundation. Storm water will be controlled by the perimeter trench and/or berm.
4. Exposed stockpiles will be covered by plastic sheeting, when inactive, until removal. Stockpiles will be encircled with hay bales, when inactive, until removal. The SWPPP controls will prevent additional protection against runoff from the Site.

4.0 EROSION AND SEDIMENT CONTROLS

Adequate erosion and sediment control methods will be provided prior to any grading, excavating, trenching or otherwise disturbing any areas. The following describes the temporary erosion and sediment controls that will be implemented at the Site.

Stabilized Remediation Entrances

A stabilized pad will be installed consisting of gravel underlain by filter cloth. This temporary measure will be used to reduce the tracking of sediments outside the work area onto adjacent pavements and public streets. A pad of gravel will be placed at the point of entry for remediation traffic onto the Site, which will be determined by the Contractor. Tires will be washed before leaving the Project Site. The truck wash wastewater drain will connect to the New York City combined on Orchard Street through the dewatering system.

Storm Drain Inlet Protection

Silt barrier/geotextile material and hay bales will be placed around existing and newly constructed inlets to reduce or eliminate sediment entering the storm drainage system. Inlet protection will be critical in reducing sediment content of water entering the storm drain system.

Spill Prevention Control and Countermeasure (SPCC) Plan

The Contractor will submit a Site-specific SPCC plan detailing its methods for preventing spills to the ground during all handling and operations. The SPCC plan shall include details of all containment and contingencies for quickly and effectively cleaning up any spilled material. Specifications and locations of materials (absorbents, etc.) will be included.

Dust Control

Several methods of controlling dust will be utilized including sprinkling water or other moisture retaining agents on dirt roadways and covering all haul trucks carrying loose materials (as necessary). The Contractor will also employ dust control measures, such as speed restrictions on Brownfield Site roads, and covering of haul trucks.

Groundwater Treatment

No groundwater treatment is anticipated

Listed below are several general practices that will be employed during remediation:

- Any materials deposited onto public thoroughfares will be promptly removed and properly disposed.
- Captured liquids requiring disposal will be containerized and transported off-Site for treatment and/or proper disposal.

- The pavement will be swept as necessary to maintain a clean work area and prevent silt from entering storm water runoff.

5.0 OPERATION, MAINTENANCE AND INSPECTION

The Contractor will have overall responsibility for implementing, monitoring and maintaining the project schedule and documenting/monitoring that appropriate controls are in place. Before, during, and after remediation of the Site, a number of erosion and sedimentation control measures will be implemented as described in Section 4. These controls will be maintained such that the quality and quantity of storm water runoff leaving the Site will not be adversely affected by remediation operations. The controls will also be maintained to deter storm water from entering the Brownfield Site and the excavation**.** The Prime Contractor/Subcontractor Certification for SWPPP implementation is provided as Appendix A.

5.1 REMEDIATION-PHASE OPERATION, MAINTENANCE AND INSPECTION

The Contractor will designate a Site Coordinator who will perform regular inspections (at least every seven calendar days and within 24 hours of the end of any storm event of 0.5 inches of rain or greater) to document/monitor that adequate pollution control measures are in place. The Brownfield Site Coordinator will also conduct regular inspections of the erosion control items currently in place to evaluate their adequacy and effectiveness, and will identify any required corrective measures and additional items required to maintain effective erosion control. It will also be the Site Coordinator's responsibility to determine what areas have been satisfactorily stabilized and determine when to remove temporary erosion control measures established for remediation. Disturbed and stabilized areas, changes in flow patterns, fencing, or preventive measures shall be documented on a Site map. A log book will be maintained to record all inspection and maintenance information and made available to regulatory authorities upon request.

The Contractor shall have a Qualified Inspector conduct site inspections in conformance with the GP-0-10-001 requirements. The Qualified Inspector shall prepare an inspection report subsequent to each and every inspection and is required to present photo documentation of practices that are identified as needing corrective actions. The photos need to be date stamped. The SWPPP will be updated monthly to indicate changes that occurred, and anticipated changes for the month ahead.

5.2 POST-REMEDIATION OPERATION, MAINTENANCE AND INSPECTION

A final Site inspection will take place before the filing of the Notice of Termination to certify that the Brownfield Site has undergone final stabilization using vegetative or structural measures and that all temporary controls have been removed or converted to permanent controls (as applicable). All disturbed areas will have permanent measures applied.

6.0 REFERENCES

- Empire State Chapter, Soil and Water Conservation Service, 2004. *Draft New York Guidelines for Urban Erosion and Sediment Control.* 2004.

- New York State Department of Environmental Conservation, 2010. *SPDES General Permit for Storm water Discharges from Construction Activity – Permit GP-0-10-001.* January 2010.

- Center for Watershed Protection, *New York State Storm Water Management Design Manual,* August 2010.

- New York State Department of Environmental Conservation*, New York Standards and Specifications for Erosion and Sediment Control*, August 2005

- New York State Department of Transportation (NYSDOT), *2002. Standard Specifications, Section 209-3, Construction Details.* 2002.

- United States Environmental Protection Agency, *Best Storm water Management Practices*

- New York City Department of Environmental Protection, *Rules and Regulations Governing the Construction of Private Sewers and Drains*

Figures

Appendix A

CERTIFICATION OF STORM WATER POLLUTION PREVENTION PLAN

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Name

Title

Date

175 Roger Avenue Commercial Development
Long Island City, New York

PRIME CONTRACTOR/SUBCONTRACTOR CERTIFICATION

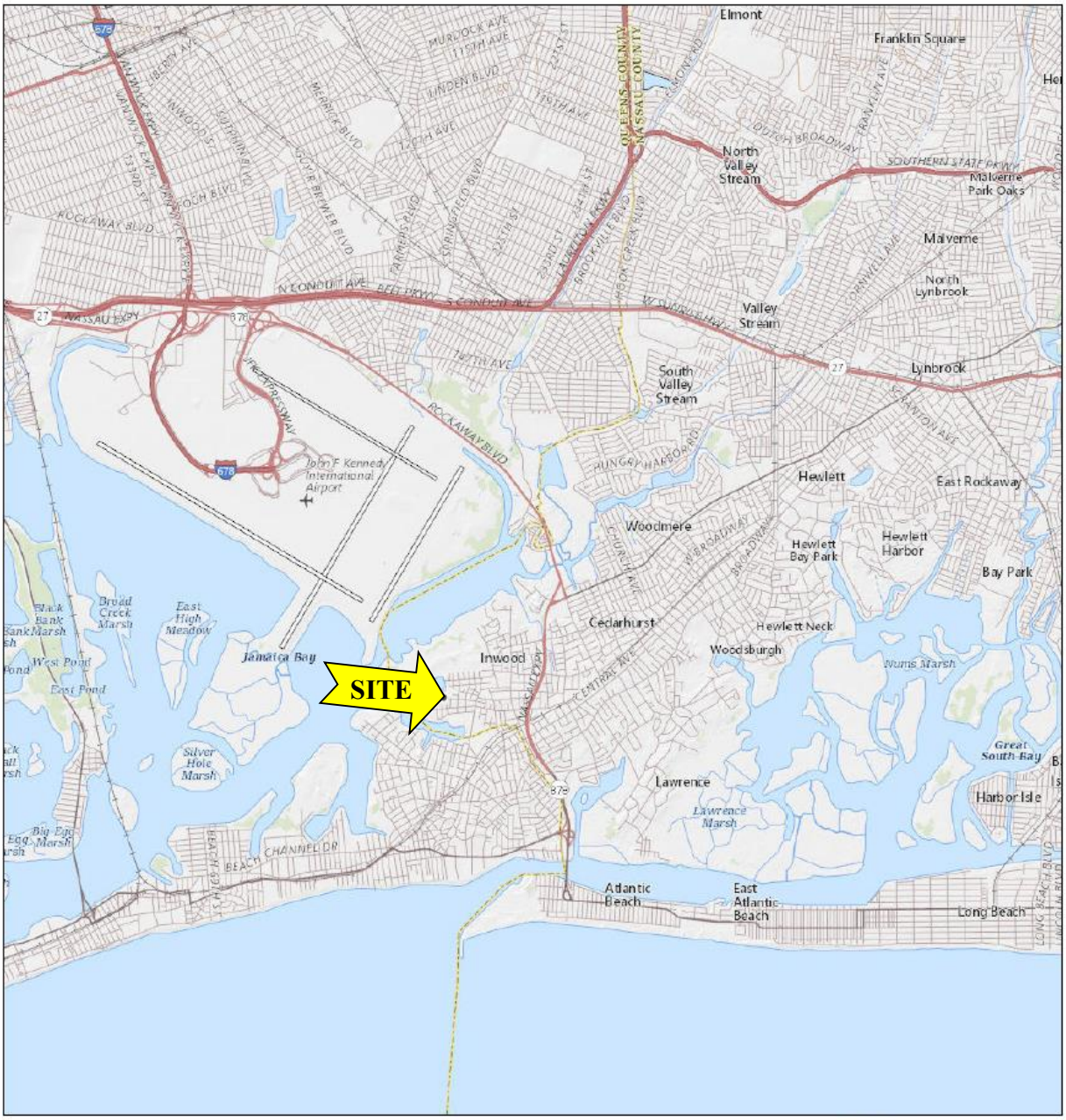
I certify under penalty of law that I understand the terms and conditions of the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Storm water Discharges from Construction Activity (Permit GP-0-10-001) that authorizes the storm water discharges associated with the remediation activities at the 175 Roger Avenue Commercial Development Site (Brownfield Site), located Roger Avenue, Town of Hempstead, Nassau County, New York.

Name

Title

Company

Date



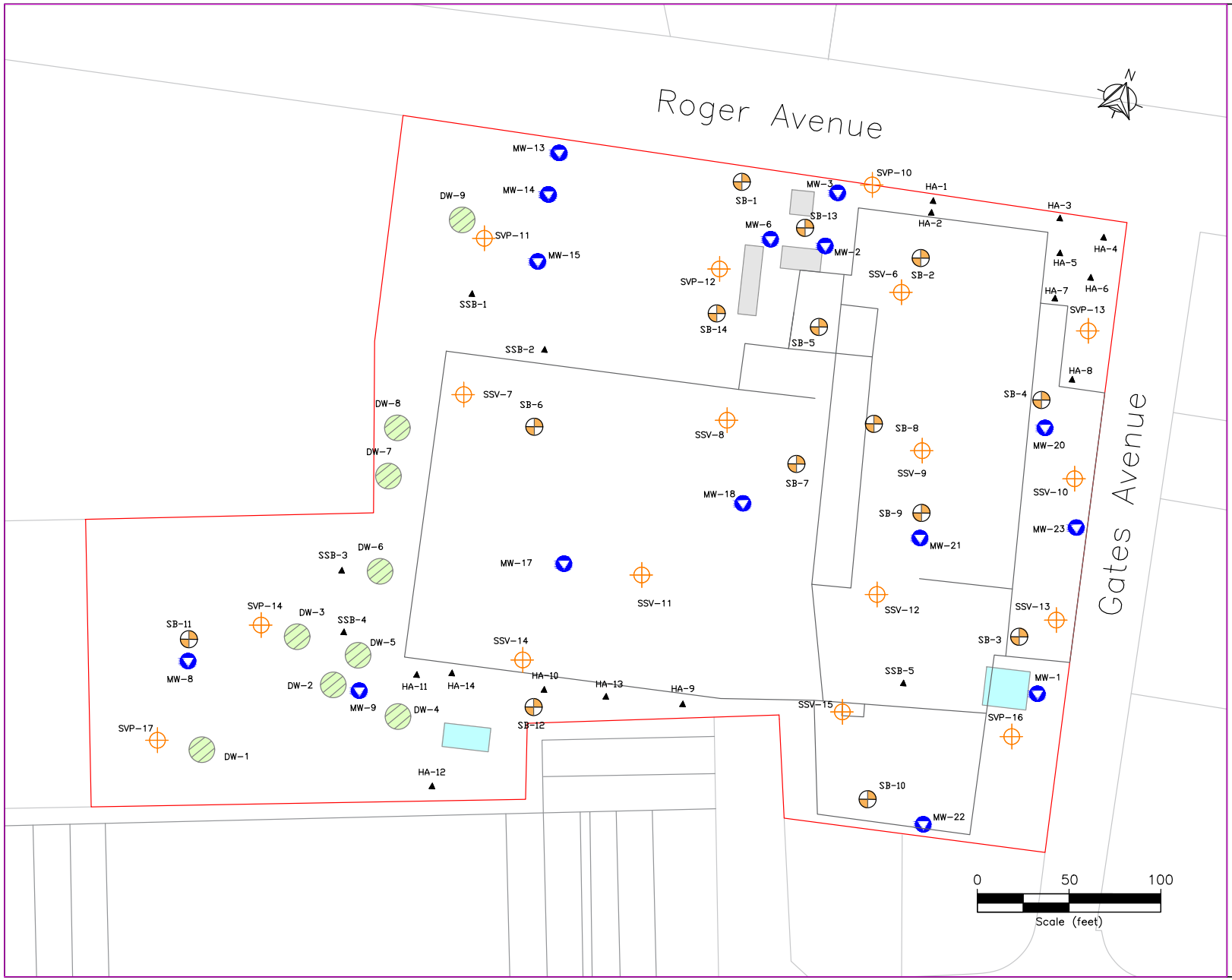
Quadrant 7.5 Minute Topographic Map, published by the USGS, and obtained from National Map Viewer ©2018

Fleming Lee Shue

FIGURE 1: SITE LOCATION MAP

SITE: 175 Rogers Ave
Inwood, NY, 11096

CLIENT: AJM Capital



FILE: /Users/shali/Desktop/Jordan/Figure 2 - Site Plan.dwg DATE: 8/28/2020

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, NY 11096
BCP No. 130164

Figure 2

Site Plan

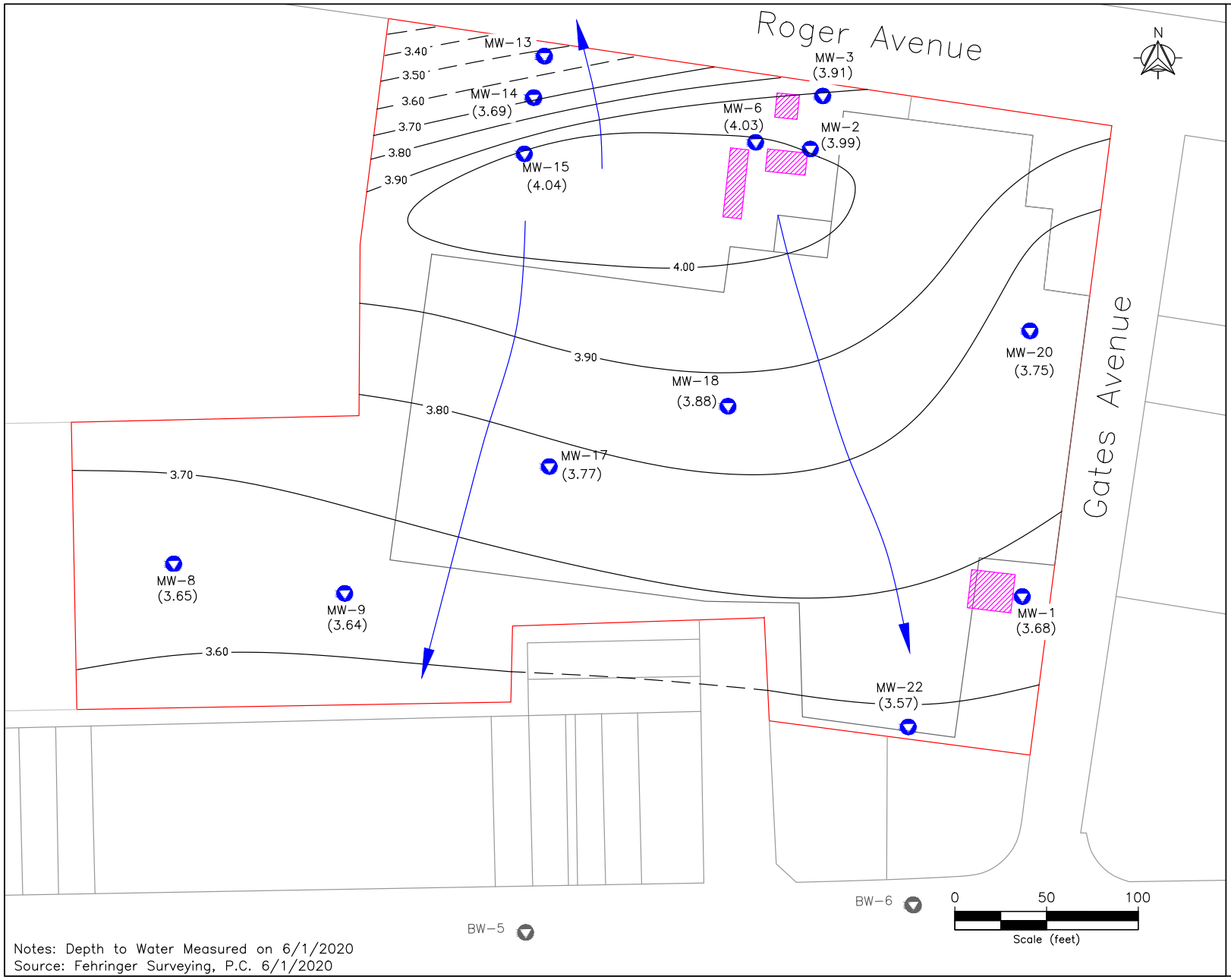
September 2020

Project Number
10188-017

LEGEND

- Former Warehouse Building and Room Outlines
- BCP Boundary
- Underground Storage Tank (UST)
- Potential UST
- Dry Well
- Existing Monitoring Well
- Soil Vapor Sample Location
- Soil Boring Sample Location
- Shallow Soil Sample Location

Notes:
Temporary groundwater samples collected from Soil Borings, except SB-11



Notes: Depth to Water Measured on 6/1/2020
Source: Fehringer Surveying, P.C. 6/1/2020

FILE: /Users/shall/Desktop/Jordan/Figure X Groundwater Contour_jo.dwg DATE: 7/22/2020

Fleming Lee Shue
Environmental Management & Consulting
158 West 29th Street, 9th Fl.
New York, NY 10001

175 Roger Avenue
Inwood, N, 11096
BCP No. C130164

Figure 3

Groundwater Flow Direction

July 2020

Project Number
10188-017

LEGEND

- Former Warehouse Building Outline
- BCP Boundary
- Geophysical Anomalies
- 18' — Existing Monitoring Well and GW Elevation
- Groundwater Contour (dashed where inferred)
- Groundwater Flow Direction

APPENDIX H

Community Air Monitoring Plan

175 Roger Avenue Commercial Development
Brownfield Cleanup Program
Site No. C130164

Section 40; Block L; Lots 5, 55, 56, 59, 117, 2579, 2585
Inwood, Nassau County, New York

COMMUNITY AIR MONITORING PROGRAM

Prepared For

AJM Capital, LLC
New York, New York 10111

Submitted to

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409

by

Fleming Engineering

April 2021

Community Air Monitoring Plan (CAMP)

Purpose

The purpose of the CAMP is to protect downwind receptors (e.g., residences, businesses, schools, nearby workers, and the public) from potential airborne contaminants released as a result of the Site investigation. The CAMP protects receptors by recording real-time particulate (dust) and Volatile Organic Compound (VOC) measurements to prevent the spread of airborne while work is in progress. The particulate and VOC action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown should they be exceeded.

The CAMP does not establish action levels for worker respiratory protection, which are given in the Health and Safety Plan and developed in accordance with 40 CFR 1910 and 1920.

Contaminant Source

The main contaminants of concern in soils are petroleum-related VOCs, benzene, ethylbenzene, toluene, xylene (BTEX); and chlorinated volatile organics (CVOCs). Metals represent a secondary and minor concern in Site dry wells.

Remediation Activities

Groundwater is approximately 4 to 6 feet below grade and will be exposed during Site remediation activities. It is not expected to have any material impact on air quality.

The one task with potential to disperse particulates or VOCs into the air is soil excavation; however, this work is largely with moist soil and is expected to materially affect air quality. Regardless, a CAMP will be implemented to ensure that potential impacts are monitored and potential receptors protected.

Receptor Population

Potentially exposed receptors during remediation include workers on Site, individuals living and working in the vicinity of the project and, to a lesser degree, passersby.

Monitoring Plan

Real-time CAMP monitoring will be conducted continuously while conducting remedial excavations, removing soil, and placing backfill. Each CAMP station will measure VOCs and particulates on a continuous basis. One CAMP station will be at the downwind perimeter of the immediate work area and a second CAMP station will be located at the fence line near the residence closest to the work area. A photoionization detector (PID)

will also be on hand to make roving VOC measurements as needed. CAMP monitoring will be in place during all Site intrusive activities including concrete and asphalt removal.

Periodic Monitoring

Periodic VOC monitoring with a PID will occur during. Periodic monitoring during excavation will consist of taking a reading upon excavating a new area, periodically while excavating an area, and at operations where there is a reasonable potential for producing material levels of VOCs.

VOC Monitoring, Response Levels, and Actions

VOCs will be continually monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) using a CAMP station and a second CAMP station near the residence closest to the work area. Upwind concentrations will be measured at the start of each workday using the CAMP station. The PID in the CAMP station will be calibrated at least daily, or more often if needed. The CAMP station will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below and prior background conditions.

- 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 must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work may 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 must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work may 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, work must cease. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulates will be continually monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) using a CAMP station and a second CAMP station near the residence closest to the work area. Upwind concentrations will be measured at the start of each workday using the CAMP station.

The particulate monitoring will be 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 and prior background levels. The equipment will be fitted with an audible alarm to indicate measurements above the action level. In addition, fugitive dust migration will be visually assessed during all work.

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

If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work will cease and a re-evaluation of activities initiated. Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration. All readings must be recorded and be available for State (DEC and DOH) personnel to review.