

96 NORTH 1ST STREET

BROOKLYN, NEW YORK

Remedial Investigation Report

NYC VCP Site Number: 15CVCP013K

OER Site Number: 14EHAZ566K

Prepared for:

Red Rock Investments, LLC

267 East Jericho Turnpike, Mineola, New York

Nathalie@islandgroup.com

Prepared by:

Hydro Tech Environmental, Corp

15 Ocean Avenue, 2nd Floor, Brooklyn, New York

(718) 636-0800

July/2014

REMEDIAL INVESTIGATION REPORT

TABLE OF CONTENTS

FIGURES.....	3
LIST OF ACRONYMS	6
CERTIFICATION	7
EXECUTIVE SUMMARY	8
REMEDIAL INVESTIGATION REPORT	12
1.0 SITE BACKGROUND.....	12
1.1 Site Location and Current Usage	12
1.2 Proposed Redevelopment Plan	12
1.3 Description of Surrounding Property.....	13
2.0 SITE HISTORY	14
2.1 Past Uses and Ownership.....	14
2.2 Previous Investigations	14
2.3 Site Inspection.....	14
2.4 Areas of Concern	15
3.0 PROJECT MANAGEMENT	16
3.1 Project Organization	16
3.2 Health and Safety	16
3.3 Materials Management.....	16
4.0 REMEDIAL INVESTIGATION ACTIVITIES.....	17
4.1 Geophysical Investigation.....	17
4.2 Borings and Monitoring Wells.....	17
4.3 Sample Collection and Chemical Analysis.....	19
5.0 ENVIRONMENTAL EVALUATION.....	23
5.1 Geological and Hydrogeological Conditions.....	23
5.2 Soil Chemistry	23
5.3 Groundwater Chemistry.....	24
5.4 Soil Vapor Chemistry	25
5.5 Prior Activity	26
5.6 Impediments to Remedial Action	26

FIGURES

Figure 1: Site Location Map

Figure 2: Site Boundary Map

Figure 3: Proposed Redevelopment Plan

Figure 4: Land Use Map

Figure 5: Map of Areas of Concern

Figure 6: Location of Soil Borings, Wells, and Soil Vapor Samples

Figure 7: Map of VOCs in soil

Figure 8: Map of SVOCs in soil

Figure 9: Map of Pesticides in soil

Figure 10: Map of Metals in soil

Figure 11: Map of VOCs in groundwater

Figure 12: Map of SVOCs in groundwater

Figure 13: Map of Metals in groundwater

Figure 14: Map of Soil Vapors

TABLES

Table 1: Soil Samples Analytical Results for VOCs

Table 2: Soil Samples Analytical Results for SVOCs

Table 3: Soil Samples Analytical Results for Pesticides and PCBs

Table 4: Soil Samples Analytical Results for Metals

Table 5: Groundwater Samples Analytical Results for VOCs

Table 6: Groundwater Samples Analytical Results for SVOCs

Table 7: Groundwater Samples Analytical Results for Pesticides and PCBs

Table 8: Groundwater Samples Analytical Results for Metals

Table 9: Soil Vapor Analytical Results

APPENDICES

Appendix A: Previous Investigation (Phase I ESA by Hydro Tech Environmental, Corp.)

Appendix B: Photographs

Appendix C: Soil Boring Geologic Logs

Appendix D: Monitoring well construction logs

Appendix E: Well purging and sampling logs

Appendix F: Soil vapor sampling log

Appendix G: Laboratory Data Deliverables for Soil Analytical Data

Appendix H: Laboratory Data Deliverables for Groundwater Analytical Data

Appendix I: Laboratory Data Deliverables for Soil Vapor Analytical Data

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CPP	Citizen Participation Plan
CSM	Conceptual Site Model
DER-10	New York State Department of Environmental Conservation Technical Guide 10
FID	Flame Ionization Detector
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Interim Remedial Measure
NAPL	Non-aqueous Phase Liquid
NYC VCP	New York City Voluntary Cleanup Program
NYC DOHMH	New York City Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCO	Soil Cleanup Objective
SPEED	Searchable Property Environmental Electronic Database

CERTIFICATION

I, Mark E. Robbins, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the 96 N. 1st Street Brooklyn Site, (NYC VCP Site No. 15CVCP013K). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

Mark E. Robbins

Qualified Environmental Professional

Date

Signature

EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

Site Location and Current Usage

The Site is located at 96 North 1st Street in the Williamsburg section of Brooklyn, New York and is identified as Block 2379 and Lot 13 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,520-square feet and is bounded by a 1-story vacant commercial building to the north, a 3-story residential building to the south, a 3-story unspecified use commercial building to the east, and a 2-story residential building to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is a vacant warehouse and contains a small office and a bathroom that allows access to the adjacent property at 94 North 1st Street.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will be residential. The redevelopment plan consists of altering the existing warehouse into a 7-story condominium building with a full basement and a rear yard. Two existing walls and foundation elements will remain. The altered building will have a height of 70 feet and will contain 6 apartment units. Each apartment unit will be 2 bedrooms. There will be 1 apartment per floor with the seventh floor consisting of two large terraces (one for each of two proposed penthouses). The building will utilize an elevator. Excavation to 10 feet bgs will be required across the proposed building footprint for a basement which will house the building's mechanical equipment. Excavation to 14 feet below grade will be required in the elevator pit area. Excavation is not anticipated below the water table. There will be no livable space in the basement. A proposed backyard will be located along the southern 20 feet of the property. The top 2 feet of soil will be excavated in the proposed backyard area and will be replaced with clean soil and covered in concrete. Approximately 1,150 cubic yards of soil/ fill is anticipated to be excavated and disposed of off Site. Layout of the proposed site development is presented in Figure 3. The current zoning designation is C2-4/M1-2/R6A/MX-8. The proposed use is consistent with existing zoning for the property.

Summary of Past Uses of Site and Areas of Concern

Based upon the review of Sanborn Fire Rate Insurance Maps, Property Shark, the City Directory and the NYC Automated City Register Information System (ACRIS) database for the Subject Property and its vicinity and the Phase I Environmental Site Assessment (ESA) Report prepared by Hydro Tech Environmental, Corp. in May 2014 a Site history was established. According to Sanborn Fire Rate Insurance Maps, the Site was depicted as a 4-story dwelling from 1887 to 1916, which was then demolished, leaving the lot vacant in 1942. A 1-story commercial building was listed as “Enamel Sprays” in 1951 and later a concrete and brick 1-story garage and storage from 1965 to 2007, which remains its current status. According to the City Directory, the occupants of the Subject Property include residences, a fur dyer, “Austoll Factory Worker” in 1934, Global Pickles in 1960, Andros Trucking Company from 1973 to 2000, Yoo 3 in Young in 2005 and The News Inc. in 2013. Historical maps indicate the original building was demolished between 1916 and 1951 and the property was redeveloped with the current one-story brick and concrete commercial use building. The historical use of enamel spray during 1951 may have involved petroleum and/or hazardous materials, potentially having had an adverse impact upon the environmental quality of the Subject Property. Henry Wojick was identified as the only previous owner from 1984 to 1999.

The AOCs identified for this site include:

1. The historical use of the Subject Property for Enamel Spray and fur dyeing.
2. The presence of historic fill material.
3. The presence of a suspect pit located in the central portion of the building.

Summary of the Work Performed under the Remedial Investigation

Hydro Tech Environmental, Corp. performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed three (3) soil borings across the entire project Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two (2) groundwater monitoring wells throughout the Site and collected two (2) groundwater samples for chemical analysis to evaluate groundwater quality;

4. Installed three (3) soil vapor probes throughout the Site and collected three (3) samples for chemical analysis.
5. The suspect test pit in the center of the building was characterized and one (1) sediment sample was collected for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property is 35 feet.
2. Depth to groundwater ranges from 38.00 to 38.45 feet at the Site.
3. Groundwater flow is generally northwest beneath the Site.
4. Bedrock was not encountered at the Site.
5. The stratigraphy of the Site, from the surface down to about 12 feet bgs, is classified as fill consisting of a mixture of gravel, sand, silt, bricks, concrete and possibly other construction debris. Drilling did not occur deeper than 12 feet bgs and bedrock was not encountered.
6. Soil/fill samples collected during the RI show the VOC acetone (max. 0.12 mg/kg) at a concentration exceeding Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs), but below Restricted Residential Use SCOs in one deep sample. VOCs detected at trace concentrations and not exceeding Unrestricted Use SCOs include 1,2,4-trimethylbenzene, 2-butanone, acetone, methylene chloride, naphthalene and tetrachloroethylene (5.3 ppb). Acetone and methylene chloride were also identified in the field blank by the laboratory. SVOCs consisting of polycyclic aromatic hydrocarbons (PAHs) were detected in all shallow samples and one deep sample at concentrations exceeding Track 2 Restricted Residential Use SCOs. These SVOCs include benzo[a]anthracene (max. 20.9 mg/kg), benzo[a]pyrene (max. 10.1 mg/kg), benzo[b]fluoranthene (max. 8.74 mg/kg), benzo[k]fluoranthene (max. 8.75 mg/kg), chrysene (max. 19.4 mg/kg), dibenzo[a,h]anthracene (max. 0.735 mg/kg), and indeno[1,2,3-cd]pyrene (max. 3.06 mg/kg). Three pesticides, 4,4'-DDD (max. 0.183 mg/kg), 4,4'-DDE (max. 0.0802 mg/kg) and 4'4-DDT (max. 0.0464 mg/kg) above Unrestricted Use SCOs, but below Restricted Residential Use SCOs. The PCB aroclor-1260 (max. 0.315 mg/kg) was detected in the

sediment pit at a concentration greater than Unrestricted Use, but below Restricted Residential Use SCOs. The metals arsenic (max. 30.1 mg/kg), barium (max. 1,550 mg/kg), cadmium (max. 27 mg/kg), lead (max. 1,450 mg/kg), and copper (max. 717 mg/kg) were detected above Restricted Residential Use SCOs. Overall, with the exception of the elevated metals levels identified in the sediment pit, soil sampling results are consistent with levels of metals and PAHs identified at Sites with historic fill material throughout NYC.

7. Groundwater sample results from the RI were compared to New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Five VOCs including benzene (max. 3 µg/L), cis-1,2-dichloroethylene (max. 17 µg/L), methylene chloride (max. 5.3 µg/L), toluene (max. 5.3 µg/L) and trichloroethylene (max. 43 µg/L) were detected above GQS. These VOCs were not detected in soil, indicating a potential off-Site source of groundwater contamination. The VOCs acetone and tetrachloroethylene were detected at concentrations less than their respective GQS. SVOCs were detected in both samples at concentrations exceeding their respective GQS. These SVOCs include benzo[a]anthracene (max. 1.39 µg/L), benzo[a]pyrene (max. 0.831 µg/L), benzo[b]fluoranthene (max. 0.697 µg/L), benzo[k]fluoranthene (max. 0.482 µg/L) and chrysene (max. 1.48 µg/L). No pesticides or PCBs were detected in the groundwater samples at concentrations exceeding method detection limits. Dissolved metals including manganese (max. 450 µg/L) and sodium (max. 162,000 µg/L) were detected at concentrations exceeding their respective GQS.
8. Soil vapor results collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results show petroleum and chlorinated VOCs at low to moderate concentrations. The BTEX compounds associated with petroleum range in concentration from 210 µg/m³ to 430 µg/m³. Chlorinated VOCs including carbon tetrachloride detected at 10 µg/m³, tetrachloroethylene (PCE) detected between 93 and 430 µg/m³, and trichloroethylene (TCE) detected between 9.9 and 29 µg/m³ were detected within monitoring/mitigation ranges. 1,1,1-Trichloroethane (TCA) was not detected in any sample.

REMEDIAL INVESTIGATION REPORT

1.0 SITE BACKGROUND

Red Rock Investments, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.058-acre site located at 96 North 1st Street in the Williamsburg section of Brooklyn, New York. Residential use is proposed for the property. The RI work was performed between June 10 and June 12, 2014. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.1 Site Location and Current Usage

The Site is located at 96 North 1st Street in the Williamsburg section of Brooklyn, New York and is identified as Block 2379 and Lot 13 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,520-square feet and is bounded by a 1-story vacant commercial building to the north, a 3-story residential building to the south, a 3-story unspecified use commercial building to the east and a 2-story residential building to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is a vacant warehouse and contains a small office and a bathroom that allows access to the adjacent property at 94 North 1st Street.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will be residential. The redevelopment plan consists of altering the existing warehouse into a 7-story condominium building with a full basement and a rear yard. Two existing walls and foundation elements will remain. The altered building will have a height of 70 feet and will contain 6 apartment units. Each apartment unit will be 2 bedrooms. There will be 1 apartment per floor with the seventh floor consisting of two large terraces (one for each of two proposed penthouses). The building will utilize an elevator. Excavation to 10 feet bgs will be required across the proposed building footprint for a basement which will house the building's mechanical equipment. Excavation to 14 feet below grade will be required in the elevator pit area. Excavation is not anticipated below the water table. There will be no livable space in the basement. A proposed backyard will be located along the southern 20 feet of the property. The top 2 feet of soil will be excavated in the proposed backyard area and

will be replaced with clean soil and covered in concrete. Approximately 1,150 cubic yards of soil/ fill is anticipated to be excavated and disposed of off Site. Layout of the proposed site development is presented in Figure 3. The current zoning designation is C2-4/M1-2/R6A/MX-8. The proposed use is consistent with existing zoning for the property.

1.3 Description of Surrounding Property

The Subject Property is located on the south side of North 1st Street, between Wythe Avenue to the west and Berry Street to the east. The vicinity of the Subject Property consists of commercial, industrial and residential properties. The ground surfaces in the vicinity of the Site consist of asphalt and concrete. The results of the Site inspection and an evaluation of the United States Geological Survey (USGS) 7-1/2 Minute Topographic Map containing the properties indicate there are two sensitive receptors present within a 0.125-mile radius of the Subject Property. The receptors are identified as Public School 084 and as “Heart Share Human Services.” The Subject Property should not impact these sensitive receptors.

Figure 4 shows the surrounding land usage.

2.0 SITE HISTORY

2.1 Past Uses and Ownership

Based upon the review of Sanborn Fire Rate Insurance Maps, Property Shark, the City Directory and the NYC Automated City Register Information System (ACRIS) database for the Subject Property and its vicinity and the Phase I Environmental Site Assessment (ESA) Report prepared by Hydro Tech Environmental, Corp. in May 2014 a Site history was established. According to Sanborn Fire Rate Insurance Maps, the Site was depicted as a 4-story dwelling from 1887 to 1916, which was then demolished, leaving the lot vacant in 1942. A 1-story commercial building was listed as “Enamel Sprays” in 1951 and later a concrete and brick 1-story garage and storage from 1965 to 2007, which remains its current status. According to the City Directory, the occupants of the Subject Property include residences, a fur dyer, “Austoll Factory Worker” in 1934, Global Pickles in 1960, Andros Trucking Company from 1973 to 2000, Yoo 3 in Young in 2005 and The News Inc. in 2013. Historical maps indicate the original building was demolished between 1916 and 1951 and the property was redeveloped with the current one-story brick and concrete commercial use building. The historical use of enamel spray during 1951 may have involved petroleum and/or hazardous materials, potentially having had an adverse impact upon the environmental quality of the Subject Property. Henry Wojick was identified as the only previous owner from 1984 to 1999.

2.2 Previous Investigations

Previous investigations performed at the Site include the following:

- Phase I Environmental Site Assessment, May 2014, Hydro Tech Environmental, Corp.

2.3 Site Inspection

Ms. Erica Johnston of Hydro Tech Environmental, Corp. performed the site inspection for the Phase I Assessment on May 5, 2014. The reconnaissance included a visual inspection of the Site. At the time of the inspection, a 1-story brick and concrete commercial use building occupied the Site. No evidence of former or present underground or aboveground storage tanks was observed. A suspect sediment pit covered by a diamond plate metal grate approximately 2' x 2' x 2' was observed in the central portion of the building. Describe in more detail – include information about the pit. If no evidence of tanks – say so.

2.4 Areas of Concern

The AOCs identified for this site include:

1. The historical use of the Subject Property for Enamel Spray and fur dyeing.
2. The presence of historic fill material at the Site.
3. The presence of a suspect pit located in the central portion of the building.

Phase 1 Report is presented in Appendix A. A map showing areas of concern is presented in Figure 5.

3.0 PROJECT MANAGEMENT

3.1 Project Organization

The Qualified Environmental Profession (QEP) responsible for preparation of this RIR is Mark E. Robbins.

3.2 Health and Safety

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements.

3.3 Materials Management

All material encountered during the RI was managed in accordance with applicable laws and regulations.

4.0 REMEDIAL INVESTIGATION ACTIVITIES

Hydro Tech Environmental, Corp. performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed three (3) soil borings across the entire project Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two (2) groundwater monitoring wells throughout the Site and collected two (2) groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed three (3) soil vapor probes throughout the Site and collected three (3) samples for chemical analysis.
5. The suspect test pit in the center of the building was characterized and one (1) sediment sample was collected for chemical analysis.

Photographs were taken during RI activities and are provided in Appendix B.

4.1 Geophysical Investigation

A geophysical survey was not conducted at the Subject Property prior to the remedial investigation.

4.2 Borings and Monitoring Wells

Drilling and Soil Logging

A total of three (3) soil probes, designated SP-1 to SP-3, were installed to a depth of 12 feet bgs. All soil probes were installed utilizing Hydro Tech's fleet of Geoprobe units with Geoprobe tooling and sampling equipment. Soil samples were collected utilizing a 4-foot long Macro Core sampler fitted with dedicated acetate liners. Each Macro Core was cut open and immediately screened with a Photo Ionization Detector (PID) for VOCs, prior to collecting the required samples for laboratory analysis. No PID readings above background concentrations were detected. The soil was screened and characterized at two-foot intervals. Continuous soil samples were collected during soil probe installation.

Boring logs prepared by a geologist are attached in Appendix C. A map showing the location of soil borings is shown in Figure 6.

Groundwater Monitoring Well Construction

Two (2) monitoring wells, designated MW-1 and MW-2, were installed. The total depth of the monitoring wells is 43 feet bgs and each well is constructed of 1-inch diameter PVC. The well screens consist of 0.020-inch slots and extend up 18 feet from the bottom of the well to intersect the water table. Groundwater was encountered at approximately 38 feet bgs. The remaining portions of the wells consist of solid riser.

Monitoring well locations are shown in Figure 6.

Survey

Soil borings, monitoring wells, and soil gas sampling locations were located by measuring to permanent site features.

Water Level Measurement

Prior to groundwater purging and sampling of the monitoring wells, the wells were gauged for the presence of Light, Non-Aqueous Phase Liquid (LNAPL) and also monitored to determine the depth to water. The well gauging and monitoring was performed utilizing a Solinst® 122 Oil/Water Interface Probe (Interface Probe). The Interface Probe can measure depths to water to 0.01 inch. Well gauging and monitoring was performed in the wells from the northern portion of the casing top. LNAPL was not identified in the monitoring wells during the well gauging exercise.

Water level data is included in Appendix E.

Soil Vapor

Two (2) soil vapor probes, designated SV-1 and SV-2, were installed to a depth of 11 feet bgs. The soil vapor probes were installed in accordance with the NYSDOH guidance for evaluating soil vapor intrusion dated October 2006. Each soil vapor sampling point consists of a stainless steel screen, or implant, fitted with dedicated polyethylene tubing. Each of the implants is of 1 ½-inch diameter. Glass beads were poured into the hole to fully encompass the screen implant and the hole was sealed with bentonite and quick dry-lock non-VOC quick set cement. A map showing the locations of soil vapor borings is shown in Figure 6.

4.3 Sample Collection and Chemical Analysis

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil, groundwater and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy.

Soil Sampling

Six (6) soil samples were collected for chemical analysis during this RI; these include three (3) shallow soil samples from zero to 2 feet bgs, one (1) sample from 2 to 4 feet bgs, and two (2) deep samples from 10 to 12 feet bgs. Samples were collected utilizing a 4-foot long Macro Core sampler fitted with dedicated acetate liners. One (1) sediment sample from the suspect sediment pit was also collected.

All samples were properly handled and placed into the appropriately labeled containers. One field blank sample and one trip blank sample were collected and submitted to the laboratory as specified in the work plan. The samples were placed in a cooler filled with ice and maintained at a maximum 4 degrees Celsius. All samples were transmitted under proper chain of custody procedures to a State-certified (ELAP) laboratory for confirmatory laboratory analyses. All holding times were met. The laboratory did not report any irregularities with respect to their internal Quality Assurance/Quality Control.

Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in Tables 1 through 4. Figure 6 shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

Groundwater Sampling

Two (2) groundwater samples were collected for chemical analysis during this RI. Groundwater samples from the monitoring wells were collected using the low stress (low flow) purging and sampling procedure. The low flow was accomplished with a Solinst Bladder Pump

and the continuous flow was monitored with a Horiba U-52 water quality monitor until the readings had stabilized.

The water samples were collected in laboratory-supplied jars, properly labeled with the sample number, the date and time of sampling, the analytical requirements, and then placed on ice for the duration of the sampling and transport to the laboratory. A chain of custody form was completed at the time of sampling and maintained until disposition of the samples at the laboratory.

Groundwater sample collection data is reported in Tables 5 through 8. Sampling logs with information on purging and sampling of groundwater monitoring wells are included in Appendix E. Figure 6 shows the location of groundwater sampling. Laboratories and analytical methods are shown below.

Soil Vapor Sampling

Three (3) soil vapor probes were installed and three (3) soil vapor samples were collected for chemical analysis during this RI. Soil vapor sampling locations are shown in Figure 6. Soil vapor sample collection data is reported in Table 9. Soil vapor sampling logs are included in Appendix F. Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006*.

A soil vapor sample was collected from each vapor probe utilizing a 6 liter pre-cleaned, passivated, evacuated whole air Summa® Canister. In order to insure the integrity of the borehole seal and to verify that ambient air is not inadvertently drawn into the sample, a tracer gas, Helium, was used to enrich the atmosphere in the immediate vicinity of the sampling location. Plastic sheeting was used to keep the tracer gas in contact with the soil vapor probe during the sampling while continuously monitoring air drawn from the implant with a helium detector (Dielectric Model MGD-2002, Multi-gas Detector). Helium Detector readings did not exceed zero ppm indicating Helium was not detected. Following verification that the surface seal was tight and prior to soil vapor sampling, approximately 0.3 ml of air was purged out of all vapor points utilizing a syringe.

The Summa Canisters were calibrated for 4 hours and the soil vapor sampling was run on each canister for the duration of 4 hours. The initial vacuum (inches of mercury) and start time was recorded immediately after opening each Summa Canister. After the sampling was

complete, the final vacuum and top time was recorded. After the soil vapor sampling, each Summa was labeled and sent to a laboratory certified to perform air analysis in New York State.

Chemical Analysis

Chemical analytical work presented in this RIR has been performed in the following manner:

Factor	Description
Quality Assurance Officer	The chemical analytical quality assurance is directed by Mark E. Robbins
Chemical Analytical Laboratory	Chemical analytical laboratory(s) used in the RI is NYS ELAP certified and was York Analytical Laboratories, Inc.
Chemical Analytical Methods	<p>Soil analytical methods:</p> <ul style="list-style-type: none"> • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); <p>Groundwater analytical methods:</p> <ul style="list-style-type: none"> • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); <p>Soil vapor analytical methods:</p> <ul style="list-style-type: none"> • VOCs by TO-15 VOC parameters.

Results of Chemical Analyses

Laboratory data for soil, groundwater and soil vapor are summarized in Tables 1 through 9. Laboratory data deliverables for all samples evaluated in this RIR are provided in digital form in Appendix G through I.

5.0 ENVIRONMENTAL EVALUATION

5.1 Geological and Hydrogeological Conditions

The Site is located in the northwestern portion of Kings County, New York. The elevation of the Subject Property is approximately 35 feet above mean sea level (USGS 7 ½-Minute Brooklyn, New York Quadrangle, 1969, Photo revised 1995).

Stratigraphy

The stratigraphy of the Site, from the surface down to about 12 feet bgs, is classified as fill consisting of a mixture of gravel, sand, silt, bricks, concrete and possibly other construction debris. Drilling did not occur deeper than 12 feet bgs and bedrock was not encountered.

Hydrogeology

Water level data for all monitor wells is included in Appendix E. The depth to water ranges from 38.00 feet to 38.45 feet. Regional groundwater flow is northwesterly.

5.2 Soil Chemistry

Soil/fill samples collected during the RI showed one VOC, acetone (max. 0.12 mg/kg), exceeding Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs) in one deep sample. Acetone and methylene chloride were also identified in the field blank by the laboratory. VOCs detected but not exceeding Track 1 SCOs include 1,2,4-Trimethylbenzene, 2-Butanone, methylene chloride, naphthalene, and tetrachloroethylene. SVOCs consisting of PAH compounds were detected in all shallow samples and one deep sample at concentrations exceeding Track 2 Restricted Use (SCOs), including benz [a]anthracene (max. 20.9 mg/kg), benzo[a]pyrene (max. 10.1 mg/kg), benzo[b]fluoranthene (max. 8.74 mg/kg), benzo[k]fluoranthene (max. 8.75 mg/kg), chrysene (max. 19.4 mg/kg), dibenzo[a,h]anthracene (max. 0.735 mg/kg), and indeno[1,2,3-cd]pyrene (max. 3.06 mg/kg). SVOCs detected but not exceeding Track 2 SCOs include 2-Methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo[g,h,i]perylene, bis[2-ethylhexyl]phthalate, dibenzofuran, di-n-butyl phthalate, fluoranthene, fluorene, naphthalene, phenanthrene and pyrene. Three pesticides (4,4'-DDD (max. 0.183 mg/kg), 4,4'-DDE (max. 0.0802 mg/kg) and 4'4-DDT (max. 0.0464 mg/kg)) were detected in the sediment pit and one shallow soil sample at concentrations greater than Track 1 SCOs. Total PCBs (max. 0.315 mg/kg) was detected in the sediment pit at a concentration greater than Track 1 SCOs. Chlordane, a pesticide, was detected in shallow samples and the sediment pit not exceeding Track 1 SCOs. Metals were detected in all samples. Arsenic (max. 30.1 mg/kg), Barium (max.

1,550 mg/kg), Cadmium (max. 27 mg/kg), Chromium, Trivalent (max. 69 mg/kg), Copper (max. 717 mg/kg), and Lead (max. 1,450 mg/kg) were detected in one shallow sample, one deep sample and the sediment pit exceeding Track 2 SCOs. Nickel (max. 74.7 mg/kg), Selenium (max. 4.72 mg/kg) and Zinc (max. 2,080 mg/kg) were detected in six (6) samples exceeding Track 1 SCOs. Manganese was detected at concentrations less than Track 1 SCOs.

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in Tables 1 through 4. Figures 7 through 10 show the locations and posts the values for soil/fill that exceed the 6NYCRR Part 375-6.8 Track 2 Soil Cleanup Objectives.

5.3 Groundwater Chemistry

Groundwater samples collected during the RI showed four (4) VOCs detected above New York State 6NYCRR Part 703.5 Groundwater Quality Standards (GQS) in both samples, including benzene (max. 3 µg/L), cis-1,2-dichloroethylene (max. 17 µg/L), methylene chloride (max. 5.3 µg/L), toluene (max. 5.3 µg/L) and trichloroethylene (max. 43 µg/L) were detected at concentrations exceeding GQS. Two VOCs (acetone and tetrachloroethylene) were detected at concentrations less than GQS. SVOCs exceeding GQS were detected in both samples, including benz [a]anthracene (max. 1.39 µg/L), benzo[a]pyrene (max. 0.831 µg/L), benzo[b]fluoranthene (max. 0.697 µg/L), benzo[k]fluoranthene (max. 0.482 µg/L) and chrysene (max. 1.48 µg/L). SVOCs acenaphthene, acenaphthylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluoranthene, fluorene, naphthalene, phenanthrene and pyrene were detected at concentrations less than GQS. No pesticides or PCBs were detected in the groundwater sample collected at the Site. Dissolved metals Manganese (max. 450 µg/L) and Sodium (max. 162,000 µg/L) and metals Barium (max. 1,280 µg/L), Chromium (max. 170 µg/L), Lead (max. 219 µg/L), Magnesium (max. 48,000 µg/L), Manganese (5,900 µg/L), Nickel (max. 118 µg/L) and Sodium (max. 161,000 µg/L) were detected at concentrations exceeding GQS. Dissolved metals detected but not exceeding GQS include Barium, Copper, Magnesium, Nickel and Zinc. Metals detected but not exceeding GQS include Arsenic, Copper and Zinc.

Groundwater samples collected during the RI show four (4) VOCs in both samples at concentrations exceeding New York State 6NYCRR Part 703.5 Groundwater Quality Standards (GQS). These VOCs include benzene (max. 3 µg/L), cis-1,2-dichloroethylene (max. 17 µg/L), methylene chloride (max. 5.3 µg/L), toluene (max. 5.3 µg/L) and trichloroethylene (max. 43

µg/L). Two VOCs (acetone and Tetrachloroethylene) were detected at concentrations less than their respective GQS. SVOCs were detected in both samples at concentrations exceeding their respective GQS. These SVOCs include benzo[a]anthracene (max. 1.39 µg/L), benzo[a]pyrene (max. 0.831 µg/L), benzo[b]fluoranthene (max. 0.697 µg/L), benzo[k]fluoranthene (max. 0.482 µg/L) and chrysene (max. 1.48 µg/L). The SVOCs acenaphthene, acenaphthylene, anthracene, benzo[g,h,i]perylene, dibenzo[a,h]anthracene, fluoranthene, fluorine, naphthalene, phenanthrene and pyrene were detected at concentrations less than GQS. No pesticides or PCBs were detected in the groundwater samples at concentrations exceeding method detection limits. Dissolved metals including Manganese (max. 450 µg/L) and Sodium (max. 162,000 µg/L) and total metals including Barium (max. 1,280 µg/L), Chromium (max. 170 µg/L), Lead (max. 219 µg/L), Magnesium (max. 48,000 µg/L), Manganese (5,900 µg/L), Nickel (max. 118 µg/L) and Sodium (max. 161,000 µg/L) were detected at concentrations exceeding their respective GQS. Dissolved metals detected but not exceeding GQS include Barium, Copper, Magnesium, Nickel and Zinc. Other metals detected at concentrations less than their respective GQS include Arsenic, Calcium, Copper and Zinc.

Data collected during the RI is sufficient to delineate the distribution of contaminants in groundwater at the Site. A summary table of data for chemical analyses performed on groundwater samples is included in Tables 5 through 8. Exceedence of applicable groundwater standards are shown.

Figures 11 through 13 show the location and posts the values for groundwater that exceed the New York State 6NYCRR Part 703.5 Class GA groundwater standards.

5.4 Soil Vapor Chemistry

Soil vapor results collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results show petroleum related and associated derivatives in each sample. The petroleum related compounds range from 9 µg/m³ to 430 µg/m³. Acetone was the highest detected petroleum related compound with a concentration of 430 µg/m³ in SV-3. Chlorinated hydrocarbons were also detected in the soil vapor samples and range from 9.9 µg/m³ to 430 µg/m³. Tetrachloroethylene was the highest detected chlorinated hydrocarbon with a concentration of 430 µg/m³.

Data collected during the RI is sufficient to delineate the distribution of contaminants in soil vapor at the Site. A summary table of data for chemical analyses performed on soil vapor samples is included in Table 9.

Figure 14 shows the location and posts the values for soil vapor samples with detected concentrations.

5.5 Prior Activity

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

5.6 Impediments to Remedial Action

There are no known impediments to remedial action at this property.