FORMER DOMSEY FIBER CORP SITE
BCP No. C224158

431 KENT AVENUE
BROOKLYN NEW YORK
Block 2135 Lot 1

REMEDIAL ACTION WORK PLAN

OCTOBER 2012

Prepared for:
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CERTIFICATIONS

I A.Czemerinski certify that I am currently a NYS registered professional engineer 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).

076508	10/22/2012	
NYS Professional Engineer #	Date	Signature

It is a violation of Article 145 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 145, New York State Education Law.

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LIST OF ACRONYMS

Acronym	Definition
AMC	AMC Engineering
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CQMP	Construction Quality Management Plan
DUSR	Data Usability Statement Report
EBC	Environmental Business Consultants
FER	Final Engineering Report
HDPE	High Density Polyethylene
IRM	Interim Remedial Measure
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PS	Public School
PVC	Polyvinyl Chloride
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RSCOs	Recommended Site Cleanup Objectives
SCG	Standards, Criteria, and Guidelines
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SSDS	Sub-slab Depressurization System
SWPPP	Stormwater Pollution Prevention Plan
SVOCs	Semi-Volatile Organic Compounds
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

This Remedial Action Work Plan has been prepared by AMC Engineering (AMC) for a commercial property located 431 Kent Avenue the Williamsburg section of Brooklyn (**Figure 1**). The site known as the Former Domsey Fiber Corp (the Site) was formally accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) through a Brownfield Cleanup Agreement (BCA) executed in May 2012. The applicant was accepted into this program as a Volunteer.

The Site address is 431 Kent Avenue. It is located on the east side of Kent Avenue between S. 9th Street and S. 11th Street in Brooklyn, New York. The site is designated as 2135 Lot 1 on the New York City Tax Map.

The Site consists of two parcels designated "A" and "B". Parcel A totals 60,448.96 sf (1.38 acres) and is bounded by S. 9th Street to the north, Wythe Avenue to the east, Kent Avenue to the west and a planned road, identified as S. 10th Street, to the south. Parcel B totals 51,015.63 sf (1.17 acres) and is bounded by a planned road, S. 10th Street, to the north, Wythe Avenue to the east, Kent Avenue to the west and S. 11th Street to the south.

The subject site is currently developed with three buildings as follows:

Two-story brick building - (44 S. 9th Street) - The two-story brick building is located on the southwest corner of the intersection of Wythe Avenue and S. 9th Street. The building was constructed prior to 1935. The building has no basement. The building was vacant, but was finished. Ceiling tiles, walls and flooring were in extremely poor condition and heavily water damaged.

Four-story brick building - (36 to 38 S. 9th Street) - The four-story brick building is adjacent to the two-story brick building, and fronts the northern portion of the lot that was formerly S. 9th Street. The building has a full basement, which is currently empty. The building was constructed

prior to 1918. A small open air alleyway is located between the two-story brick building and the four-story brick building. An old transformer shed is located at the rear of the alley.

Warehouse building - The majority of the lot is developed with a one-story concrete block warehouse building that was constructed in 1959. The southern half of the building is currently utilized by Lucky Supplies, which is a warehouse facility that sells plastic food containers. They operate from loading docks that enter/exit from S. 11th Street. The other half of the warehouse building is currently vacant. The northwestern portion of the warehouse building has a second floor which is set up as office space (also vacant).

The site was developed prior to 1884 and occupied by a variety of industrial and commercial operations through 1945 including a steam pump manufacturer, machine shop, leather belting manufacturer, pen manufacturer, tin shop, silver polish manufacturer, a blacksmith, coffin manufacturer, paint manufacturer, wagon maker, parking garage, auto repair, rag sorting, iron & steel storage yard, fur dressing and dyeing, plating, cut sole manufacturing, appliance manufacturing and an analytical laboratory.

By the 1947, nearly all of the site occupants had been replaced by the F&M Schaeffer Brewing Company, which utilized the older buildings as warehouse storage. The F&M Schaeffer Brewing Company closed its Brooklyn facility in 1976. Several businesses conducted operations at the site following Schaeffer, most notably the Domsey Fiber Corp (a used clothing factory with on-site dry cleaning and an outlet store that operated in the mid 1980's to early 2000's) and Brooklyn Sleep Products (reconditioning of used mattresses and new mattress manufacturing). The majority of the property is vacant and underutilized. One business remains on the property, and is identified as Lucky Supply, Inc. (an aluminum and plastic food storage container distributor and warehouse that still operates the southern half of the warehouse building).

Petroleum contamination was observed in soil and groundwater during the installation of soil borings at the site in January 2012. The NYSDEC was notified of these conditions and Spill No. 11-12869 was assigned.

Summary of the Remedial Investigation

A Remedial Investigation Work Plan (RIWP) was prepared for this site and approved for implementation by the NYSDEC on June 18, 2012 following a 30-day public review period from April 4 through May 4, 2012. The goals of the Remedial Investigation were to define the nature and extent of contamination in soil, groundwater and any other impacted media; to identify the source(s) of the contamination; to assess the impact of the contamination on public health and/or the environment; and to provide information to support the development of a Remedial Work Plan to address the contamination.

Activities completed under the RI:

- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples
- Soil sampling and analysis for petroleum compounds in soil samples from soil boring locations;
- The installation of groundwater monitoring wells
- The collection and analysis of groundwater samples for petroleum compounds;
- The collection of analysis of soil gas and indoor air samples for VOCs from soil gas sampling locations.

The field work portion of the RI was conducted by Environmental Business Consultants (EBC) from January 13th to August 20th 2012, in accordance with the protocols and methods as established in the approved Remedial Investigation Work Plan).

The results of sampling performed during the RI identified CVOCs and SVOCs in soil that are likely related to a surface spill of waste fuel oil in the northwest corner of the building. The contaminants were found to be limited to the top 12-13 feet of soil within something less than a 35 foot radius.

The release scenario is unknown but likely involves a release from waste fuel stored in a drum or aboveground tank near the loading dock area. Waste PCE was likely discharged to the same container resulting in PCE contaminated waste oil which was then accidentally spilled during

loading or due to a collision with a piece of equipment such as a fork lift or truck. The released fuel was of insufficient quantity to migrate through the 20 foot soil column to the water table, terminating at a depth of 12-13 feet below the surface.

Groundwater at this location was found to have the highest SVOC concentrations; however CVOC concentrations were some of the lowest reported on-site (13 µg/L). The SVOC concentrations in groundwater at this location may simply be an artifact of installing the temporary well through the contaminated soil zone. In either case there is no indication that CVOCs in groundwater are related to this area.

The wide distribution of chlorinated VOCs in groundwater may be a function of the limited slope in the water table though such distribution could also be related to an induced hydraulic condition such as a pumping well. Although pumping wells are common at commercial laundry facilities due to the large amounts of water used, there is no evidence to suggest that commercial laundry operations were performed at a large scale at the Site. It is also unlikely, however, that such a well would go unnoticed during a site inspection of an operating facility (1999 Phase I) or that the well would not be registered. The quality of the groundwater this close to the East River would also make it unsuitable for laundry use.

Based on the groundwater flow direction and distribution of CVOCs across and upgradient of the site, a low level CVOC plume is migrating onto the property from the northeast (upgradient). Although there are no known sources in this area, leaking City sewer lines are known to be responsible for CVOC contamination elsewhere in the City. There is a significant topographic elevation drop of 10 feet between Wythe Avenue along the east property line and Kent Avenue along the west property line. Leakage along the sewer along Wythe Avenue would almost certainly migrate west toward the River and across the property. This would result in the wide distribution of CVOCs along the east property line.

CVOCs are either off-gassing from affected groundwater beneath the site and / or migrating onto the site in vapor form. The highest concentrations of CVOCs in soil gas were reported at the west property line however, which suggests an off-site source may be present in this area as well.

The highest concentration (by an order of magnitude) of PCE in soil gas was the P-SG8 location along the west property line in the southern half of the building (occupied warehouse). The highest concentrations of TCE in soil gas were also in the warehouse building along the east and south property lines. This distribution does not appear to correlate with PCE and TCE distribution in groundwater in which the highest concentrations were reported in the northeast corner of the property. Elevated levels of PCE and TCE were not reported within interior or perimeter soil gas locations within Zone A in the northwest corner of the building where the only detection of PCE in soil was reported. Therefore there also does not appear to be a correlation between PCE contamination in soil and that in soil gas.

Fill materials containing elevated levels of heavy metals were documented throughout the site at a depth which ranged from 2 foot below the building's slab grade in the eastern part of the site to 12 feet below grade along the western side. The increase in fill thickness is likely related to the 10 foot elevation change between Wythe Avenue which borders the property to the east and Kent Avenue which borders the property to the west. With the exception of a few isolated occurrences of individual metals such as chromium, nickel, silver and manganese, native soil beneath the fill largely meets Unrestricted SCOs.

Qualitative Human Health Exposure Assessment

The qualitative exposure assessment identified potential completed routes of exposure to construction workers and remediation workers through inhalation, ingestion and dermal contact during excavation activities. The Health and Safety Plan prepared for the site identifies such exposures and provides instructions for on-site workers to minimize potential exposure. Occupants in the proposed on-site residential buildings may be exposed to VOCs through the vapor intrusion pathway if VOCs in source area soil and groundwater are not remediated, or if preventive measures such as vapor barriers or sub-slab ventilation are not employed.

The exposure assessment also identified potential exposure to commercial workers and residents in adjacent buildings both upgradient and downgradient of the site., to vapor intrusion from an off-site CVOC source. Off-site exposure from CVOCs in groundwater to indoor air would be

expected to be greater to residential properties located upgradient of the site where concentrations in both soil gas and groundwater may be higher than those found on the site.

Potential environmental impacts through the groundwater to surface water discharge were not expected based on the absence of CVOC contaminants migrating onto the adjacent downgradient property.

Summary of the Remedy

The remedy recommended for the Site consists of the removal of petroleum and CVOC hotspot area in the northwest corner of the property and the removal of all fill material with parameters above unrestricted SCOs. The remedy will include the following items:

1. Removal of petroleum and CVOC impacted soil from an approximate 1,500 sf area in the northwest corner of the property.
2. Removal of chromium, silver, nickel and manganese impacted soils from several isolated areas at the site.
3. Excavation of soil/fill exceeding Track 1 SCOs listed in Table 1; Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
4. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs;
5. 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;
6. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Table 1, (2) all Federal, State and local rules and regulations for handling and transport of material.
7. Installation of a sub-slab depressurization system and vapor barrier beneath occupied areas of the building to be constructed on the Site.
8. If Track 1 SCOs are not achieved, a composite cover system consisting of the concrete building slab comprising the site development and/or two feet of soil meeting the SCOs as set forth in 6 NYCRR Part 375-6.7(d) and Table 375-6.8(b) will be constructed.

9. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
10. An Environmental Easement will be filed against the Site to ensure implementation of the SMP. The environmental easement for implementation of the SMP must be extinguished within 5 years to attain a Track 1 Cleanup.

Although the goal of the remedy will be to remove all soil exceeding the Track 1 SCOs on both parcels, the need for an SSDS may result in a Track 2 remedy on one or both parcels if operation is required to continue beyond 5 years. Likewise, if Track 1 SCOs cannot be achieved on one or both parcels then a Track 2 or Track 4 remedy may result on one or both parcels.

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

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

Wythe and Kent Realty, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in May 2012, to investigate and remediate a 3.09-acre property located at 431 Kent Avenue in Kings County, New York. Wythe and Kent Realty, LLC is a Volunteer in the Brownfield Cleanup Program. A residential use is proposed for the property. When completed, the Site will be redeveloped with 16 new 7-Story apartment buildings. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between January 13, 2012 and August 20, 2012. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that this Site does not pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document will not be prepared.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in Kings County, New York City, New York and is identified as Block 2135 Lot 1 on the Brooklyn Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (**Figure 1**) shows the Site location. The Site consists of two parcels designated "A" and "B". Parcel A totals 60,448.96 sf (1.38-acre) and is bounded by S. 9th Street to the north Wythe Avenue to the east, Kent Avenue to the West and a planned road, identified as S. 10th Street, to the south. Parcel B totals 51,015.63 sf (1.17 acres) and is bounded by a planned road,

S. 10th Street, to the North, Wythe Avenue to the east, Kent Avenue to the west and South 11th Street to the South (see **Figure 2**). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 2.55-acre property is fully described in **Attachment A – Metes and Bounds.**

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

The site is to be redeveloped through the new construction of sixteen 7-story apartment buildings. The buildings will be separated into 4 rows comprised of 4 buildings each. S.10th Street will be extended as a private road with two rows of buildings located north and south of the street. Each row of buildings will front on a street (S.11th, S. 10th and S. 9th). With the exception of S. 10th Street the entire lot will be excavated to approximately 13 feet below existing grade. Each row of buildings will extend two-thirds back from street frontage with an at grade courtyard area behind each building. The cellar level below the courtyard areas and a portion of the buildings will be utilized as an underground parking garage with ramp access from Kent Avenue. The remaining portion of the cellar level below the buildings will be used for utility rooms and storage.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The surrounding land use (**Figure 3**) includes new multi-family residential buildings to the north, a new multi-use commercial / residential development to the northwest, an underutilized commercial property to the west, residential buildings to the east and older commercial / industrial properties to the south. In general the area was historically characterized by heavy industrial and commercial properties. The area has been changing in response to the upzoning and many of the industrial/commercial buildings are being converted to, or replaced by, new residential buildings and schools.

The property is zoned R7A residential. The proposed project is compatible with the surrounding land use, and will be in compliance with the current zoning.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated June 2012. The investigation was conducted between January 13, 2012 and August 20, 2012.

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

2.1.1 Borings

Forty soil borings were advanced to evaluate the extent and degree of impact in the identified and suspect source areas and to obtain general soil quality information across the site. Drilling services were provided by LVS inc. of Wading River, NY and Eastern Environmental Services of Manorville, NY.

At each soil boring location soil samples were collected continuously in 4 or 5-foot intervals using a Geoprobe™ model 54LT or 6620DT, probe drilling machine. The Geoprobe™ system uses a direct push hydraulic percussion system to drive and retrieve core samplers. Depending on the model probe rig used, soil samples were retrieved using either a 1.5-inch diameter, 4-foot or 5-foot long macro-core sampler with disposable acetate liners.

Each soil sample recovered from the soil borings was characterized by an experienced geologist qualified environmental professional (QEP) and field screened for the presence of VOCs using a photo-ionization detector (PID). The geologist's field observations and PID readings were recorded for each boring in a soil boring log. The location of soil borings are shown on **Figure 4**.

2.1.2 Monitoring Wells

In accordance with the RI Work Plan, a total of 9 temporary (ZAGW1-GW3, ZBGW1-GW4, ZCGW1-GW4, ZDGW1), 11 (MW1S-11S) shallow and 4 deep (MW3D, MW4D, MW6D and MW7D) groundwater monitoring wells were installed from 1/13/12 to 6/26/12 to establish general groundwater quality at the site, define the extent of VOC contamination in groundwater and to determine the magnitude and direction of a potential contaminant plume migrating from

the site. Four off-site wells (MW12-MW15) were installed in August 2012, to evaluate and confirm that a CVOC plume was migrating onto the property as indicated by the on-site groundwater data.

Shallow wells were installed to a total depth of 30 ft, approximately 8 feet below the water table. Deep wells were installed to a depth of 40 feet below grade. Shallow wells were constructed of 1-inch diameter PVC casing and ten feet (20 ft – 30 ft BG) of 0.010 inch slotted PVC well screen. Deep wells were constructed of the same materials and 5 feet of screen (35-40 ft BG).

At each well a No. 00 morie filter sand was placed in the borehole to within 2 feet above the top of the screen. A 1-foot hydrated bentonite seal was then placed on top of the filter sand and the remainder of the borehole was backfilled to grade. Following installation, each of the wells was surveyed to determine relative casing elevation to the nearest 0.01 ft and horizontal position to the nearest 0.1 ft.

Prior to sampling, a synoptic round of depth-to-groundwater (DTW) measurements was obtained from the wells on 6/27/12 to determine the water table elevation and to calculate the volume of standing water in the well.

2.1.3 Samples Collected

A summary of the sampling performed during the RI is provided in **Table 2**.

2.1.3.1 Soil Samples

A total of 151 soil samples were collected from the 40 soil borings performed at the site. To match the proposed Site redevelopment plans, the Site was divided into four Zones (Zones A - D) Collected soil samples from each zone were as follows:

Zone A

- Initial Borings: A total of 7 borings were performed in Zone A during the initial mobilization. Soil samples from soil borings B1, B2, B3 and B4 were retained from 0 to 2 feet below grade and 13 to 15 below grade. An additional soil sample was retained

from soil boring B3 from the 2 foot interval that exhibited the highest PID response (10 to 12 feet below grade). Each of the 9 soil samples were retained for laboratory analysis of volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs-BN) by EPA Method 8270, TAL metals, pesticides and PCBs by EPA Methods 8081/8082. EBC also retained shallow soil samples (0 to 2 or 2 to 4 feet below grade) from soil borings PCB2, PCB3, and PCB4 for laboratory analysis of PCBs only. Each of three PCB soil borings were performed to a depth of approximately 8 feet below grade.

- Supplemental Borings: Six supplemental borings were installed (ZA-B6 - ZA-B10). Borings B5 and B6 were advanced to a depth of 20 feet with samples retained from 13-15 ft, 15-17 ft and 17-19 ft and submitted for the metals of concern at each location (B5-chromium, B6-manganese). Borings B7-B10 we advanced to depths or 25 and 30 feet depending on the location. Since elevated PID readings were not observed, two samples were retained from each location and submitted for VOC and SVOC analysis; the water table interface and at the termination depth of the boring, in accordance with the approved work plan.

Zone B

- Initial Borings: A total of twelve soil borings were performed in Zone B. For soil borings B1-B7, soil samples were collected continuously from grade to a final depth of 20 feet below existing grade. Soil samples from soil borings B1-B7 were retained from 0 to 2 feet below grade and 13 to 15 below grade. Each of the 12 soil samples retained from soil borings B1-B7 were submitted for laboratory analysis of VOCs by EPA Method 8260, SVOCs-BN by EPA Method 8270, TAL metals, and pesticides and PCBs by EPA Methods 8081/8082. EBC also retained shallow soil samples (0 to 2 feet below grade) from soil borings Lead 1, Lead 2, and Lead 3 for laboratory analysis of TAL metals only. Each of three PCB soil borings were performed to a depth of approximately 5 feet below grade.

- Supplemental Borings: One supplemental boring (ZB-B7) was installed. The boring was advanced to a depth of 30 feet with samples retained from the 13-15 ft, 15-17 ft and 17-19 ft intervals and submitted for analysis of chromium, hexavalent chromium and silver.

Zone C

- Initial Borings: A total of six soil borings (B1 to B6) were performed in Zone C. For soil borings B1-B6, soil samples were collected continuously from grade to a final depth of 20 feet below existing grade using a five-foot steel macro-core sampler with acetate liners and Geoprobe direct-push equipment. Soil samples from soil borings B1-B6 were retained from 0 to 2 feet below grade and 13 to 15 below grade. Each of the 11 soil samples retained from soil borings B1-B7 were submitted for laboratory analysis of VOCs by EPA Method 8260, SVOCs-BN by EPA Method 8270, TAL metals, and pesticides and PCBs by EPA Methods 8081/8082.

- Supplemental Borings: Four supplemental borings (ZC-B7 - ZC – B10) were installed. Each boring was advanced to a depth of 20 feet with samples retained from the 13-15 ft, 15-17 ft and 17-19 ft intervals and submitted for analysis of chromium, hexavalent chromium and nickel.

Zone D

- Initial Borings*:* A total of four soil borings (B1 to B4) were performed in Zone D. For each of the soil borings, soil samples were collected continuously from grade to a final depth of 20 feet below existing grade. Soil samples from the four soil borings were retained from 0 to 2 feet below grade and 13 to 15 below grade. Each of the 8 soil samples retained from soil borings B1-B7 was submitted for laboratory analysis of VOCs by EPA Method 8260, SVOCs-BN by EPA Method 8270, TAL metals, and pesticides and PCBs by EPA Methods 8081/8082.

2.1.3.2 Groundwater Samples

Groundwater samples were obtained from the eleven temporary water table wells as they were installed during the January 2012 mobilization. Groundwater samples from the shallow and deep

monitoring wells (MW1S-11S, MW3D, MW4D, MW6D, MW7D) were collected on June 27, 2012.

Samples were collected in accordance with the procedures outlined in section 2.2 of the approved RIWP. A peristaltic pump and polyethylene sampling tubing was used to purge and collect samples from each well / temporary probe location. Sample tubing and the silicone pump tubing was replaced between each sample location. Samples were collected directly into pre-cleaned laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

All groundwater samples from the temporary monitoring wells were analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals (total and dissolved) and pesticides/PCBs by Method 8081/8082. Groundwater samples from the shallow and deep monitoring were analyzed for VOCs / SVOCs.

Based on the results of the January and June 2012 groundwater sampling events, which indicated that a CVOC plume was migrating onto the property from the northeast, four additional monitoring wells (MW12-MW15) were installed upgradient of the site in August 2012. These wells along with five previously existing on-site wells (MW1S, MW2S, MW6S, MW7S and MW9S) were sampled on August 20, 2012 and submitted for analysis of VOCs only.

2.1.3.3 Soil Gas Samples

To assess the presence of VOCs in soil gas beneath the site, twelve soil gas samples (ZASG1-SG3, ZBSG1-SG3, ZCSG1-SG3 and SDSG1-SG3) were collected at the site during the initial mobilization on January 24, 2012. Thirteen perimeter soil gas samples (PSG1-PSG2), four indoor air (IA1-IA2) and one outdoor air sample were collected on June 26, 2012 during the second mobilization. All soil gas samples were collected over a 2 hr sampling period while the indoor and outdoor samples were collected over an 8 hr period.

Soil vapor and outdoor ambient air samples were collected in accordance with the procedures as described in section 2.4 of the approved RIWP and the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 10/06)*.

2.1.4 Chemical Analytical Work Performed

Each soil and groundwater sample was placed in pre-cleaned laboratory supplied glassware, and placed in a cooler packed with ice for transport to the laboratory. Sample analysis was provided by C Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

Soil samples were analyzed for one or more of the following depending on location and depth: VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals, hexavalent chromium and pesticides/PCBs by Method 8081/8082. All groundwater samples from the temporary monitoring wells were analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals (total, dissolved) and pesticides/PCBs by Method 8081/8082. Groundwater samples collected in June 2012 from the shallow and deep monitoring wells were analyzed for VOCs / SVOCs. Groundwater samples collected from the four off-site wells (MW12-MW15) and five of the previously existing on-site wells (MW1S, MW2S, MW6S, MW7S and MW9S) were sampled on August 20, 2012 and submitted for analysis of VOCs only.

Soil gas samples analyzed for VOCs by EPA method TO-15.

2.1.5 Documentation

Maps showing the locations of the soil borings, monitoring wells and soil gas sample collection points are provided in **Figures 4**, **5** and **6**. The results of sample soil, groundwater and soil gas samples collected during the RI are summarized in **Tables 3** through **35**. Below is a summary of RI findings.

The results of sampling performed during the RI, identified CVOCs and SVOCs in soils which are likely related to a surface spill of waste fuel oil in the northwest corner of the building. The

contaminants were found along to be limited to the top 12 to 13 feet of soil within something less than a 35 foot radius.

The release scenario is unknown but likely involves a release from waste fuel stored in a drum or aboveground tank near the loading dock area. Waste PCE was likely discharged to the same container resulting in PCE contaminated waste oil which was then accidentally spilled during loading or due to a collision with a piece of equipment such as a fork lift or truck. The released fuel was of insufficient quantity to migrate through the 20 foot soil column to the water table, terminating at a depth of 13 to 15 feet below the surface.

Groundwater at this location was found to have the highest SVOC concentrations; however CVOC concentrations were some of the lowest reported on-site (13 µg/L). The SVOC concentrations in groundwater at this location may simply be an artifact of installing the temporary well through the contaminated soil zone. In either case there is no indication that CVOCs in groundwater are related to this area.

CVOC impacts to groundwater were highest near the northeast corner of the Site. Based on the groundwater flow direction, the distribution of CVOCs across the site and the presence of CVOCs off-site and immediately upgradient of the property, a low level CVOC plume appeared to be migrating onto the property from the northeast (upgradient). This was confirmed in August 2012 through the installation of four off-site monitoring wells upgradient of the Site.

Although there are no known sources in this area, leaking City sewer lines are known to be responsible for CVOC contamination elsewhere in the City. There is a significant topographic elevation drop of 10 feet between Wythe Avenue along the east property line and Kent Avenue along the west property line. Leakage along the sewer along Wythe Avenue would almost certainly migrate west toward the River and across the property. This would result in the wide distribution of CVOCs along the east property line.

CVOCs are either off-gassing from affected groundwater beneath the site and / or migrating onto the site in vapor form. The highest concentrations of CVOCs in soil gas were reported at the west property line however, which suggests an off-site source may be present in this area as well.

The highest concentration (by an order of magnitude) of PCE in soil gas was the P-SG8 location along the west property line in the southern half of the building (occupied warehouse). The highest concentrations of TCE in soil gas were also in the warehouse building along the east and south property lines. This distribution does not appear to correlate with PCE and TCE distribution in groundwater in which the highest concentrations were reported in the northeast corner of the property. Elevated levels of PCE and TCE were not reported within interior or perimeter soil gas locations within Zone A in the northwest corner of the building where the only detection of PCE in soil was reported. Therefore there also does not appear to be a correlation between PCE contamination in soil and that in soil gas.

Fill materials containing elevated levels of heavy metals were documented throughout the site at a depth which ranged from 2 foot below the building's slab grade in the eastern part of the site to 12 feet below grade along the western side. The increase in fill thickness is likely related to the 10 foot elevation change between Wythe Avenue which borders the property to the east and Kent Avenue which borders the property to the west. With the exception of a few isolated occurrences of individual metals such as chromium, nickel, silver and manganese, native soil beneath the fill largely meets Unrestricted SCOs.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH have reviewed the RI Report and have determined that this Site does not pose a significant threat to human health and the environment. Notice of that determination was provided during the public comment period from August 1 though September 15 through fact sheet No. 2 and the Proposed Decision Document.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

Previous owners and operators of the property are shown in the tables below. Information regarding ownership of the property was obtained from online property records maintained by the NYC Department of Finance Office of the City Register under its Automated City Register Information System (ACRIS) and from hard copy records at the agencies regional office. Information regarding past operators was obtained from Sanborn Fire Insurance maps, Certificates of Occupancy and from telephone directory listings. Prior to 1960 the Subject Site was comprised of multiple small lots on two separate blocks; block 2144 which was located north of S. 10th Street and block 2135 which was located south of S. 10th Street. Owners included a variety of individuals and corporations. Prior to 1947 the Site was occupied by a number of industrial and commercial tenants. Following World War II, the Schaefer Brewing Company, which had a large brewing operation across the street from the Site, began to expand and take over lots at the subject Site. By 1947 Schaefer either owned or conducted operations on most of the subject Site. In the 1950's Schaefer eliminated S. 10th Street and Blocks 2144 and 2155 were combined as Block 2135. The individual Lots were also combined as Lot 1. Schaefer sold the property in 1977. Domsey Fiber Corp began operations at the Site in 1986 and operated a large used clothing industrial plant with approximately 200 workers until approximately 2002. Brooklyn sleep products, a used mattress refurbisher and new mattress manufacturer operated at the site from about 1998 to 2008.

Previous Owners
Blocks 2144 and 2155 (prior to 1960)

Dates	Name	Comments	Contact Info
Prior to 1900 to 2/7/42	Merrill Brothers	Deed, 29-31 South 11th Street Block 2155, Lot 29	Unknown
2/7/1942 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 29-31 South 11th Street Block 2155, Lot 29	485 Madison Avenue, New York, NY 10022
Prior to1900 to 3/2/1944	Merrill Brothers	Deed, 15-27 South 11th Street Block 2155, Lot 1	Unknown
3/2/1944 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 15-27 South 11th Street Block 2155, Lot 1	485 Madison Avenue, New York, NY 10022
Prior to 1918 to 11/13/1937	Kent Ave Mfg Co Inc (formerly King Paint Mfg Co)	Deed, 449-453 Kent Avenue Block 2144	Unknown

11/13/1937 to 8/15/1940	Kent Ave Realty Corp	Deed, 449-453 Kent Avenue Block 2144	Unknown
8/15/1940 to 2/4/1944	Robert M. King	Deed, 449-453 Kent Avenue Block 2144	Unknown
2/4/1944 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 449-453 Kent Avenue Block 2144	485 Madison Avenue, New York, NY 10022
9/13/1919 to 11/18/1940	Elbee Chocolate Co Inc	Deed, 30-44 So. 9th Street Block 2144	Unknown
11/18/1940 to 10/24/1942	Williamsburg Savings Bank	Deed, 30-44 So. 9th Street Block 2144	Unknown
10/24/1942 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 30-44 So. 9th Street Block 2144	485 Madison Avenue, New York, NY 10022
11/22/1925 to 3/8/1932	John McCarthy	Deed, 447 Kent Avenue Block 2144	Unknown
3/8/1932 to 12/10/1943	Mary McCarthy	Deed, 447 Kent Avenue Block 2144	Unknown
12/10/1943 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 447 Kent Avenue Block 2144	485 Madison Avenue, New York
6/22/1926 to 3/23/1945	Schoolsky, Israel	Deed, 28 So. 9th Street Block 2144	Unknown
3/23/1945 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 28 So. 9th Street Block 2144	485 Madison Avenue, New York, NY 10022
7/10/1925 to 4/18/1933	Samuel Kaplan	Deed, 33-39 South 10th Street Block 2144	Unknown
4/18/1933 to 10/19/1942	Salens Realty Corporation	Deed, 33-39 South 10th Street Block 2144	Unknown
10/19/1942 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 33-39 South 10th Street Block 2144	485 Madison Avenue, New York, NY 10022
1/24/1939 to 2/4/1944	James Heaney Jr.	Deed, 441-443 Kent Ave Block 2144	Unknown
2/4/1944 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 441-443 Kent Ave Block 2144	485 Madison Avenue, New York, NY 10022
12/10/1943 to 1/9/1946	Louise Proios	Deed, 445 Kent Avenue Block 2144	Unknown
1/9/1946 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 445 Kent Avenue Block 2144	485 Madison Avenue, New York, NY 10022
12/11/1947 to 8/29/1958	Felix Minet	Deed, 43 South 10th Street Block 2144, Lot 21	Unknown
8/29/1958 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 43 South 10th Street Block 2144, Lot 21	485 Madison Avenue, New York, NY 10022
11/16/1939 to 9/5/1941	Realty Associates Inc	Deed, 30-20 South 10th Street Block 2155, Lot 7	Unknown
9/5/1941 to	Lillian Wilson	Deed, 30-20 South 10th Street	Unknown

9/16/1941		Block 2155, Lot 7	
9/16/1941 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 30-20 South 10th Street Block 2155, Lot 7	485 Madison Avenue, New York, NY 10022
11/24/1943 to 1/6/1944	James Crawford	Deed, 42 South 10th Street Block 2155	Unknown
7/30/1935 to 11/24/1943	Hugo n. Sundquist	Deed, 42 South 10th Street Block 2155	Unknown
11/24/1943 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 42 South 10th Street Block 2155	485 Madison Avenue, New York, NY 10022
5/2/1940 to 4/4/1943	Nellie Conley	Deed, 36-38 South 10th Street Block 2155, Lot 15	Unknown
4/4/1943 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 36-38 South 10th Street Block 2155, Lot 15	485 Madison Avenue, New York
1/11/1946 to 5/13/1946	Thomas Baffa	Deed, 508 Wythe Avenue Block 2155, Lot 18	Unknown
5/13/1946 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 508 Wythe Avenue Block 2155, Lot 18	485 Madison Avenue, New York
7/30/1938 to 12/3/1946	Emily Mellon (formerly Sheeran)	Deed, 510 Wythe Avenue Block 2155, Lot 19	Unknown
12/3/1946 to 7/15/1947	Byron Clark	Deed, 510 Wythe Avenue Block 2155, Lot 19	Unknown
7/15/1947 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 510 Wythe Avenue Block 2155, Lot 19	485 Madison Avenue, New York, NY 10022
12/10/1923 to 1/11/1946	Paul Marggraf	Deed, 512 Wythe Avenue Block 2155, Lot 20	Unknown
1/11/1946 to 1/18/1946	Thomas Baffa	Deed, 512 Wythe Avenue Block 2155, Lot 20	Unknown
1/18/1946 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 512 Wythe Avenue Block 2155, Lot 20	485 Madison Avenue, New York, NY 10022
6/14/1948 to 9/14/1948	Byron Clark	Deed, 514 Wythe Avenue Block 2155, Lot 21	Unknown
9/14/1948 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 514 Wythe Avenue Block 2155, Lot 21	485 Madison Avenue, New York, NY 10022
12/24/1940 to 1/6/1947	Salvatore Dialosa	Deed, 516 Wythe Avenue Block 2155, Lot 22	Unknown
1/6/1947 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 516 Wythe Avenue Block 2155, Lot 22	485 Madison Avenue, New York
7/7/1937 to 2/10/1942	Winifred R. Taylor	Deed, 518 Wythe Avenue Block 2155, Lot 23	Unknown
2/10/1942 to 7/27/1950	Philip Hartenstein	Deed, 518 Wythe Avenue Block 2155, Lot 23	Unknown
7/27/1950 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 518 Wythe Avenue Block 2155, Lot 23	485 Madison Avenue, New York, NY 10022
Prior to	City of New York	Deed, 520-524 Wythe Ave Block	Unknown

3/12/1952		2155, Lots 24, 25, 26	
3/12/1952 to 6/19/1952	Alvin E. Heutchy	Deed, 520-524 Wythe Ave Block 2155, Lots 24, 25, 26	Unknown
6/19/1952 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 520-524 Wythe Ave Block 2155, Lots 24, 25, 26	485 Madison Avenue, New York, NY 10022
2/7/1942 to 8/21/1946	Ruth and Lena Hartenstein	Deed, 29-31 South 11th Street Block 2155, Lot 29	Unknown
8/21/1946 to 1/17/1947	Louis Karmen, Morris Karmen, and Abraham Glaser	Deed, 29-31 South 11th Street Block 2155, Lot 29	Unknown
1/17/1947 to 3/11/1977	F&M Schaefer Brewing Company	Deed, 29-31 South 11th Street Block 2155, Lot 29	485 Madison Avenue, New York

Block 2135 Lot 1 (Post 1960)

Dates	Name	Comments	Contact Info
3/11/77 to 4/7/77	G.F.S. Realty Corp	Deed	208 S. La Salle Street Suite 1285 Chicago, IL
4/7/77 to 6/16/77	Shula Limited Partnership	Deed	208 S. La Salle Street Chicago, IL
6/16/77 to 7/15/80	NY City Industrial Development Agency	Deed	225 Broadway, New York, NY
7/15/80 to 12/22/80	Peter Galasso	Deed	79 Wheatley Road, Old Westbury, NY 11569
12/22/80 to 1/8/96	Albert Edery and Arthur Salm	Deed	211 East 70th Street, New York, NY 562 East Shore Drive, Kings Park, NY
1/8/86 to 4/11/96	NY City Industrial Development Agency	Deed	110 Williams Street, New York, NY
4/11/96 to 1/25/02	Domsey Trading Corp	Deed	431 Kent Avenue, Brooklyn, NY Current: 625 Wortman Avenue Brooklyn, NY 11208-5438
1/25/02 to 5/16/07	Wythe Gardens LLC	Deed	98 Cuttermill Road, Great Neck, NY
5/16/07 to 7/1/11	Waterview Gardens LLC	Deed	98 Cuttermill Road, Great Neck, NY
7/1/11 to Present	Wythe and Kent Realty LLC	Deed	144 Spencer Street, Brooklyn, NY

Previous Operators

Dates	Name	Comments	Contact Info
prior to 1874 to sometime prior to 1932	1. Guild and Garrisons 2. Steam Pump Works	Sanborn Maps	Unknown
Prior to 1887 to sometime prior to 1904	1. Black Smith Shop 2. Merrill Brothers-Machine Shop 3. New York & Brooklyn Coffin	Sanborn Maps	Unknown
Prior to 1887 to sometime prior to 1918	1. New York Leather Belting 2. Edward Todd & Co. Gold Pen Manufacturing	Sanborn Maps	Unknown
Prior to 1899 to sometime prior to 1904	1. Edward F. Davis- Silver Polish Manufacturing	Sanborn Maps	Unknown
Prior to 1904 to sometime prior to 1918	Vogel Brothers-Tin Makers	Sanborn Maps	Unknown
Prior to 1915 to sometime prior to 1928	Improved Appliance Company	Sanborn Maps	Unknown

Prior to 1918 to sometime prior to 1928	1. Levine Brothers Inc.-Confectionary 2. Wagon Making	Sanborn Maps	Unknown
Prior to 1918 to sometime prior to 1945	King Paint Manufacturing Company	Sanborn Maps	Unknown
Prior to 1928 to sometime prior to 1932	Superior Fur Shearing and Refining	Directory	Unknown
Prior to 1928 to sometime prior to 1947	1. McCarthy Boiler Manufacturer 2. Reingold Brothers-Fur Dyers	Sanborn Maps Directory	Unknown
Prior to 1932 to sometime prior to 1947	1. Unidentified Parking Garage 2. Elbee Chocolate Co. 3. Unidentified Rag Sorting 4. Unidentified Iron & Steel Storage Yard 5. Unidentified Auto Repair 6. Meskin Brothers-Fur Dyers	Sanborn Maps Directory	Unknown
Prior to 1940 to sometime prior to 1947	1. Berkman Brothers - Platers 2. Wm Graham Inc.-Cut Sole Manufacturers	Directory	Unknown
Prior to 1947 to sometime prior to 1977	F&M Schaefer Brewing Company	Sanborn Maps	Unknown
Prior to 1985 to sometime prior to 1996	1. Plastic City 2. Landav's Quilts & Pillows	Directory	Unknown
From 1986 to sometime prior to 2002	Domsey Trading Corp.	Sundry Agreement	431 Kent Avenue, Brooklyn, NY
Between 1998 to sometime prior to 2008	1. Excelsior Trading 2. Brooklyn Sleep Products	Internet Listing Site Inspection	431 Kent Avenue, Brooklyn, NY
Prior to 2008 to present	Lucky Supply Inc.	Internet Listing Site Inspection	15 S. 11th Street, Suite 200 Brooklyn, NY

The following resources were employed in obtaining historical information with respect to ownership:

- NYC ACRIS Database
- NYC Department of Finance records, Brooklyn Borough office

The following resources were employed in obtaining historical information with respect to operators:

- Interviews with Previous Operators
- Environmental Data Resources - City Directory Search
- Sanborn Fire Insurance Maps
- Certificate of Occupancy Records as Maintained by the Department of Buildings

2.3.2 Phase I and Phase II Reports

Summary of Phase I Report (EBC January 2012)

The Phase I report noted that the site was developed prior to 1884. From 1884 through 1945 the property was occupied by a variety of industrial and commercial operations including a steam pump manufacturer, machine shop, leather belting manufacturer, pen manufacturer, tin shop, silver polish manufacturer, a blacksmith, coffin manufacturer, paint manufacturer, wagon maker, parking garage, auto repair, rag sorting, iron & steel storage yard, fur dressing and dyeing, plating, cut sole manufacturing, appliance manufacturing and an analytical laboratory.

By 1947, nearly all of the site occupants had been replaced by the F&M Schaeffer Brewing Company, which utilized the older buildings as storage for their brewing operations which were conducted on the adjacent properties to the west (430 to 490 Kent Avenue). The F&M Schaeffer Brewing Company constructed three new large storage buildings on Block 2144 in the late 1940's, and utilized the parking garage on the north side of South 10th Street as a private parking garage.

In the late 1950's, the F&M Schaeffer Brewing Company combined the properties into a single lot by constructing a large 1 and 2-story warehouse and office building that extended from South 11th Street to South 9th Street, eliminating South 10th Street. The warehouse building was utilized for storage of packaged goods. The second floor located along the Kent Avenue and South 11th Street fronts was utilized as office space. Two old buildings on the corner of South 9th Street and Wythe Avenue were not demolished, and continued to be utilized as storage and office space. The F&M Schaeffer Brewing Company closed its Brooklyn facility in 1976.

Tenants of the warehouse and office building since 1976 include Domsey Fiber Corp (a used clothing factory with on-site dry cleaning and an outlet store that operated in the mid 1980's to early 2000's), Brooklyn Sleep Products (reconditioning of used mattresses and new mattress manufacturing), and Lucky Supply, Inc. (an aluminum and plastic food storage container distributor and warehouse that still operates the southern half of the warehouse building).

The Phase I report identified the following recognized environmental conditions:

- The former use of the subject site as a large pump manufacturer (Guild and Garrison's Pump Works) which consisted of both large machine shop operations and a blacksmith on the subject site.
- The former use of the subject site as a machine shop (Merrill Bros).
- The former use of the subject site as a paint manufacturing facility (King Paint Manufacturing Company) on the subject site.
- A shed noted on historic Sanborn maps as being used for the storage of benzene.
- The former use of a portion of the subject site by a leather manufacturer (NY Leather and Belt Company.
- The former use of a portion of the subject site as an auto repair facility.
- An underground gasoline tank noted on historic Sanborn maps (1935, 1947, 1950) within a former parking garage.
- A large electrical transformer noted on historic Sanborn maps in the northeast corner of the subject site.
- The former use of the subject site by a fur dressing facility (Meskin Bros Fur Dressing).
- The former use of the subject site as a plating operation (Berkman Bros.).
- The former use of an adjacent property as a Manufactured Gas Plan (MGP).
- Laboratory results of a soil sample collected from a previous investigation that indicates lead may be present at a hazardous concentration.

EBC recommended performing a Phase II Subsurface Investigation at the subject site to include the collection and laboratory analysis of subsurface soil samples and groundwater samples.

Summary of Phase II Report (Don Carlo December 2001)

On December 29, 2000, Don Carlo Environmental Services, Inc. (DCES), conducted a Phase II Subsurface Investigation at the subject site and adjacent property to the north (44 South 8th Street) based on the findings of the Phase I performed by EEA, Inc. in 1999. The subsurface investigation consisted of a ground penetrating radar (GPR) survey of the interior of the main warehouse building and the installation of 34 soil borings. Eighteen of the thirty-four soil borings

were performed within the subject site buildings, and the remaining 16 borings were conducted on the adjacent property to the north.

For each soil boring, soil samples were collected continuously from grade to a depth of 15 feet. No groundwater was encountered during drilling, and no groundwater samples were collected as a part of the investigation. From each soil boring location, one sample was retained for laboratory analysis from the interval 0 to 4 feet below grade, and one soil sample was retained for laboratory analysis from either the interval that exhibited the highest PID readings or, if no elevated PID readings were observed, the second soil sample retained for laboratory analysis was collected from the bottom of the soil boring. Each of the retained soil samples were analyzed for volatile organic compounds (VOCs) semi-volatile organic compounds (SVOCs), metals, pesticides and PCBs. For the two soil samples collected from the basement areas (B16 and B17), a tripod core drill and split spoon sampler were utilized. No VOCs were detected at an elevated concentration within any of the soil samples, and only relatively low SVOC concentrations (indicative of historic fill) were detected within some of the soil samples. Several metals were detected at elevated concentrations including lead, which was detected at a concentration of 8,288 ppm within the shallow soil sample (0 to 4ft below grade) from soil boring B13. Due to the elevated concentration of lead within the soil sample, soil excavated from that area may require classification as a hazardous substance.

The shallow depths of the soil samples (above the water table) and the absence of groundwater samples limited the usefulness of the investigation to the characterization of shallow fill materials only.

2.3.3 Sanborn Maps

Sanborn fire insurance maps for the subject site and surrounding area were reviewed for the years 11887, 1904, 1918, 1922, 1928, 1935, 1947, 1950, 1965, 1977, 1979, 1980, 1981, 1982, 1984, 1986, 1987, 1989, 1991, 1992, 1993, 1995, 1996, 2001, 2002, 2003, 2004, 2005, 2006 and 2007. The review is summarized below. Copies of Sanborn maps are included as **Attachment B**.

Subject Property Historical Usage

1887

The 1887 Sanborn map indicates both South 10th Street and South 9th Street extended through the subject site from Wythe Avenue to Kent Avenue. This created a northern lot bounded by South 9th Street, Wythe Avenue, Kent Avenue and South 10th Street, and a southern lot bounded by South 10th Street, Wythe Avenue, Kent Avenue and South 11th Street.

The New York & Brooklyn Coffin Company is located in the center of the block with two 5-story buildings along S. 9th Street (36 to 38 S. 9th Street) and a 2-story stable along S. 10th Street (35 S. 10th Street). The rest of the northern portion of Block 2144 is comprised of six lots along 9th Street (30 to 34 9th Street and 40 to 44 9th Street) each developed with either a 2½ or 3-story dwelling. On the western side of the lot along Kent Avenue there are two vacant undeveloped lots in the northwest corner (441 to 443 Kent Avenue). Two 3-story dwellings are located south of the vacant lots at 445 and 447 Kent Avenue. The "De Castro & Donner Sugar Warehouse" operates in a 2-story warehouse at 449 to 451 Kent Avenue. On the southwest corner of Block 2144 two dwellings are drawn (453 to 455 Kent Avenue), one 2½- stories and the other 2-stories. The dwelling at 455 Kent Avenue has an adjoining 2-story building, a small 1-story shed, and a 2-story stable extending along S. 10th Street. A 2-story dwelling is drawn at 31 S.10th Street with a 1-story shed in the rear yard. At 33 S. 10th Street a 3-story dwelling is located along S. 10th Street with a 6-story manufacturing building shown in the rear yard. East of the New York & Brooklyn Coffin Company along the southern portion of Block 2144 are a 1-story stable (39 S. 10th Street), a 2½- story dwelling (41 S. 10th Street), and a 4-story building (the corner of S. 10th Street and Wythe Avenue). A 3-story dwelling is drawn at 498 Wythe Avenue and a 2½–story dwelling with frontage along S. 9th Street.

The portion of the subject site that is located south of S. 10th street is labeled as Block 2155 and is separated into numerous small lots. The northwest region of Block 2155 is occupied by "Guild and Garrisons Pump Works" with a 3-story machine shop, a 1-story machine shop, a blacksmith, and a 4-story building labeled paper storage (452 to 463 Kent Avenue and 20 to 30 S. 10th Street). The southwest region of Block 2155 is occupied by "Merril Bros." with a 2-story

machine shop and a pattern shop at 465 Kent Avenue. The building on the corner of S. 11th Street and Kent Avenue is a 3-story building occupied by "Merril Bros" on the first floor as a machine shop (2) and "NY Leather Belting Company" on the second and third floors (471 Kent Avenue and 15 to 25 S. 11th Street). The southern portion of Block 2144 is occupied by a small 2-story building (27 S. 11th Street) and a large 3-story building (29 to 31 S. 11th Street). The 3-story building along S. 11th Street has a blacksmith on the first two floors and "Gold Pen Manufacturing" on the third floor. The eastern portion of the block is occupied by 3-story dwellings along Wythe Avenue. The northern portion of Block 2155 is occupied by a stable and a 2-story dwelling in the rear of their lots at 32 and 34 S. 10th Street. East of that at 36 S. 10th Street a 2-story dwelling is shown along S. 10th Street and a 2-story stable is in the rear of lot extending into the neighboring lot (38 S. 10th Street).

1904

In the northern area (Block 2144) the former New York & Brooklyn Coffin Company has changed to "NY and Brooklyn Casket". The southern portion of NY and Brooklyn Casket's property was redeveloped with a new 5-story building along S. 10th Street from 33 to 37 S. 10th Street, a 1-story building in the rear yard, and a 4-story building along S. 10th Street at 39 S. 10th Street. All of the buildings in the southern portion of NY and Brooklyn Casket operations are labeled as having kilns. The northern end of NY and Brooklyn Casket has extended west to 34 S. 9th Street and redeveloped the lot into a 5-story building. A four-story stable labeled as "Vogel Bros" is drawn on the north end of Block 2144 (28 S. 9th Street) located along S. 9th Street.

The southern area of the subject site (Block 2155) shows Guild and Garrison Pump Works extending their operations west with a new 2-story pattern shop at 32 S. 10th Street and a 1-story elevator extending into the rear yard. At 34 S. 10th Street the former 2-story dwelling is now shown as pattern storage for Guild and Garrison Pump Works.

1918

The northern area of the subject site (Block 2144) shows 33 through 39 S. 10th Street vacant and undeveloped (the former NY and Brooklyn Casket Company kiln area). A 1-story building is labeled "wagon making" and is located at 31 S. 10th Street. The 2-story building at the corner of

Kent Avenue and S. 9th Street is occupied by "Improved Appliance Company" as a gas appliance manufacturer. The former 2-story sugar storage facility (451 to 459 Kent Avenue) is now occupied by "King Paint Manufacturing Company" **(3)**. A small shed in the rear yard is labeled as "Benzine Shed" **(4)**. A thin 4-story building on S. 9th Street (28 S. 9th Street) is labeled as "Vogel Bros" for use as auto parking and storage. Vogel Bros. was a tin manufacturer that operated a large facility on the adjacent property to the north. A new 5-story building and adjacent 4-story building located at 32 to 38 S. 9th street are labeled as the "Levine Bros Confectioners". Several dynamos (electric generators), engines and large boilers are drawn within the 5-story building.

The southern area of the subject site (Block 2155) indicates the NY Leather and Belt Company **(5)** occupied all of the existing buildings from 15 to 27 S. 11th Street and 465 to 471 Kent Avenue. They also occupy the first two floors of the 3-story building from 29 to 30 S. 11th Street (the third floor remains Penn Manufacturing).

1947

The entire western and northern portions of Block 2144 (441 to 455 Kent Avenue and 18 to 44 S. 9th Street) is labeled as the F&M Schaefer Brewing Company, for use as miscellaneous storage.

The entire western portion of Block 2155 (457 to 471 Kent Avenue) is labeled as the F&M Schaefer Brewing Company for use as miscellaneous storage (formerly "Guild and Garrison Pump Works" and "Meskin Bros Fur Dressing"). The entire eastern portion of Block 2155 (506 to 526 Wythe Avenue) is displayed as undeveloped (formerly 3-story dwellings).

1950

Much of Block 2155 is drawn as having being redeveloped with several large one-story storage buildings for use by the F&M Schaefer Brewing Company. The only other prior buildings that remain on Block 2155 after the redevelopment include the 3-story building from 29 to 31 S. 11th Avenue (utilized as keg storage for F&M Brewing Company) and a small 3-story store at the corner of Wythe Avenue and S. 11th Street.

1965

The subject site is no longer split in half by S. 10th Street and the entire block is labeled as Block 2144. The subject site was redeveloped with a large 1-story, irregularly shaped, packaged goods warehouse for F&M Brewing Company that was built in 1959. The building runs from 498 to 526 Wythe Avenue in the east and from Kent Avenue to Wythe Avenue in the south. The western portion of Block 2144 shows the 1-story building from 463 to 471 Kent Avenue and a 2-story building from 441 to 461 Kent Avenue. The 2-story building has offices on the second floor and also runs from 18 to 34 S. 9th Street. The 4-story building from 36 to 38 S. 9th Street remains and is utilized as offices. A 1-story storage building is shown on the corner of Wythe Avenue and S. 9th Street.

1977

Block 2144 is now labeled as Block 2135.

1979

S. 9th Street no longer separates Block 2135 (to the north) from the subject site (former Block 2144), merging the blocks.

1980-2007

No significant changes were noted for the subject site.

2.4 GEOLOGICAL CONDITIONS

The geologic setting of Long Island is well documented and consists of crystalline bedrock overlain by layers of unconsolidated deposits. According to geologic maps of the area created by the United States Geologic Survey (USGS), the bedrock in this area of Brooklyn is an igneous intrusive classified as the Hartland formation of middle Ordovician to middle Cambrian age. Unconsolidated sediments overlie the bedrock and consist of Pleistocene aged sand, gravel and silty clays, deposited by glacial-fluvial activity. Non-native fill materials consisting of dredge spoils, rubble and / or other materials have been historically used to reinforce and extend shoreline areas and to raise and improve the drainage of low lying areas.

Subsurface soils at the site include a silty non-native fill with bricks, wood and other rubble which ranges in thickness from 2 foot below the building's slab grade in the eastern part of the site to 12 feet below grade along the western side. The increase in fill thickness is likely related to the 10 foot elevation change between Wythe Avenue which borders the property to the east and Kent Avenue which borders the property to the west. A native fine brown silty-sand is present immediately below the fill material to a depth of approximately 14 feet below grade. The fine silty-sand layer is underlain by a fine to coarse sand and gravel layer to the water table approximately 22 feet below grade.

Groundwater at the Site is present at a depth of approximately 17 to 23 feet below surface grade within the native silty-sand. Well casing elevation and depth to water measurements were used to create a groundwater elevation map (**Figure 7).** As shown in the figure, groundwater flow is generally from the northeast to the southwest though there is an apparent mound in the water table in the northwest portion of the site. The mound may be related to tidal influences from the East River which is less than 450 feet to the east, subsurface structures, or poor drainage in this area of the building. The potentiometric difference between shallow and deep well couplets were essentially neutral with no upward or downward potential.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

Although the date(s) and circumstances surrounding the release of petroleum at the site are not known, it can be assumed that fuel oil or diesel fuel spill occurred in the northwest corner of the Site. There are no known or suspect underground storage tanks in this area however there is loading dock in this area of the site and at least one 275 gallon above ground fuel oil tank was known to be present in this half of the building. The tank was observed in the central area of the north building during an inspection and was found to be disconnected and discarded. It is therefore likely that the fuel was related to a surface spill of waste fuel oil /diesel fuel within the building which seeped into the ground through voids in the concrete.

The source of the PCE contamination in soil is unknown but appears to be associated with the fuel oil as they were both limited to the same location and depth. The dry-cleaning machine was reported to be located on the second floor of the building making direct release from the machine unlikely. However such facilities generate waste in the form of spent solvents which may have been stored or spilled in this area of the building. Poorly sealed floor drains may also be a conduit for solvents and/or fuel oil to have entered the subsurface in this area. Under this scenario the waste fuel would be stored in a drum or aboveground tank near the loading dock area. Waste PCE was likely discharged to the same container resulting in PCE contaminated waste oil which was then accidentally spilled during loading or due to a collision with a piece of equipment such as a fork lift or truck.

The released fuel was of insufficient quantity to migrate through the 20 foot soil column to the water table, terminating at a depth of 12 to 13 feet below the surface. Groundwater at this location was found to have the highest SVOC concentrations; however CVOC concentrations were some of the lowest reported on-site (13 µg/L). The SVOC concentrations in groundwater at this location may simply be an artifact of installing the temporary well through the contaminated soil zone. In either case there is no indication that CVOCs in groundwater are related to this area.

The wide distribution of chlorinated VOCs in groundwater may be a function of the limited slope in the water table though such a distribution could also be related to an induced hydraulic condition such as a pumping well. Although pumping wells are common at commercial laundry facilities due to the large amounts of water used, there is no evidence to suggest that commercial laundry operations were performed at a large scale at the Site. It is also unlikely, however, that such a well would go unnoticed during a site inspection of an operating facility (1999 Phase I) or that the well would not be registered. The quality of the groundwater this close to the East River would also make it unsuitable for laundry use.

Based on the groundwater flow direction, the distribution of CVOCs across the site and their elevated concentrations off-site and immediately upgradient of the property, a low level CVOC plume appears to be migrating onto the property from the northeast (upgradient). Although there are no known sources in this area, leaking City sewer lines are known to be responsible for

CVOC contamination elsewhere in the City. There is a significant topographic elevation drop of 10 feet between Wythe Avenue along the east property line and Kent Avenue along the west property line. Leakage from the sewer along Wythe Avenue would be expected to migrate west toward the River and across the property. This would result in the wide distribution of CVOCs along the east property line.

CVOCs are either off-gassing from affected groundwater beneath the site and / or migrating onto the site in vapor form. The highest concentrations of CVOCs in soil gas were reported at the east property however which suggests an off-site source may be present in this area as well.

Elevated levels of chromium and nickel were identified in native soil at a depth of 13 to 15 feet below grade in the south central area of the property. Since the metals were reported in native soil as opposed to fill material and since the fill material at this location did not contain elevated levels of these metals, an on-site source related to plating or historic leather dyeing operations was suspected. However, supplemental sampling in this and in other areas of the site with elevated levels of metals indicate that they are isolated occurrences and do not appear to be related to former operations at the site.

2.5.2 Description of Areas of Concern

The primary area of concern is an area near the loading dock in the northwest corner of the Building in which subsurface soil is contaminated with SVOCs and CVOCs. The contamination is assumed to be related to a release of waste fuel oil / diesel fuel contaminated with PCE. The zone of impacted soil extends from 13 to 15 feet below the surface over an approximate area of less than 1,500 square feet.

The released fuel was of insufficient quantity to migrate through the 20 foot soil column to the water table, terminating at a depth of 12 to 13 feet below the surface. Groundwater at this location was found to have the highest SVOC concentrations; however CVOC concentrations were some of the lowest reported on-site (13 µg/L). The SVOC concentrations in groundwater at this location may simply be an artifact of installing the temporary well through the contaminated soil zone. In either case there is no indication that CVOCs in groundwater are related to this area.

No other source areas were identified or indicated during the RI. Elevated levels of SVOCs and metals reported in shallow soil throughout the site are characteristic of the historic fill materials present at the site and throughout the area. Elevated levels of chromium and nickel were identified in native soil at a depth of 13 to 15 feet below grade in the south central area of the property. Since the metals were reported in native soil as opposed to fill material and since the fill material at this location did not contain elevated levels of these metals, an on-site source related to plating or historic leather dyeing operations was suspected. However, supplemental sampling in this and in other areas of the site with elevated levels of metals indicate that they are isolated occurrences and do not appear to be related to former operations at the site.

Contaminated media documented at the site includes soil, groundwater and soil gas which was found to be contaminated with VOCs and / or SVOCs during the RI.

2.5.3 Soil/Fill Contamination

The soil boring program successfully delineated the extent of petroleum and PCE contamination identified in the northwest corner of the site (vicinity of ZA-B3), which was associated with the NYSDEC Spill file. The zone of impacted soil is limited to less than a 35 foot radius around the ZA-B3 boring (1,500 sf) and to a vertical depth of 13 feet.

Fill materials containing elevated levels of heavy metals were documented throughout the site at a depth which ranged from 2 foot below the building's slab grade in the eastern part of the site to 12 feet below grade along the western side. The increase in fill thickness is likely related to the 10 foot elevation change between Wythe Avenue which borders the property to the east and Kent Avenue which borders the property to the west. With the exception of a few isolated occurrences of individual metals such as chromium, silver, nickel and manganese, native soil beneath the fill largely meets Unrestricted SCOs.

Elevated levels of chromium and nickel were identified in native soil at a depth of 13 to 15 feet below grade in the south central area of the property. Since the metals were reported in native soil as opposed to fill material and since the fill material at this location did not contain elevated levels of these metals, an on-site source related to plating or historic leather dyeing operations

was suspected. However, supplemental sampling in this and in other areas of the site with elevated levels of metals indicate that they are isolated occurrences and do not appear to be related to former operations at the site.

2.5.3.1 Summary of Soil/Fill Data

Soil sample results from the RI are summarized in **Tables 3-23**. Further information on soil sample collection, handling and analysis can be found in the RI Report (EBC 7/12).

2.5.3.2 Comparison of Soil/Fill with SCGs

Table 24 shows sample results above Track 1 Unrestricted SCOs for all overburden soil at the Site. **Figures 8-10** are spider maps which show soil boring locations and summarize sample results above Track 1 Unrestricted SCOs for all overburden soil.

2.5.4 On-Site and Off-Site Groundwater Contamination

With the exception of 1,2,4 / 1,3,5-TMB in the MW4D sample there were no Petroleum VOC impacts to groundwater. SVOC parameters were detected in the parts per trillion range across most of the site but appear to be representative of general groundwater quality in the area. There were some SVOC detections at the ZA-GW3 location which do appear to be related to the SVOCs reported in soil at this location. However since the groundwater samples was collected from the same boring as the impacted soil it is likely that the SVOCs in groundwater were the result of the drilling process since elevated SVOCs were not reported in the deeper soil sample from the ZA-B3 location.

CVOC impacts to groundwater were highest near the northeast corner and shown to be migrating onto the property from an unknown source northeast of the Site. The absence of CVOCs in soil in this area and the site wide distribution of CVOCs in groundwater is consistent with this conclusion.

2.5.4.1 Summary of Groundwater Data

The results of groundwater samples collected during the RI are summarized in **Tables 25-32**. Further information on groundwater sample collection, handling and analysis can be found in the RI Report (EBC 6/12).

2.5.4.2 Comparison of Groundwater with SCGs

Sample results above GA groundwater standards in monitor wells prior to the remedy are shown in **Table 33**. Spider maps which show groundwater sampling locations and summarize results above GA groundwater standards prior to the remedy are shown in **Figures 11** through **13**.

2.5.5 On-Site and Off-Site Soil Vapor Contamination

Total VOC concentrations detected in soil-gas samples collected during the RI were elevated due to high concentrations of ethanol and isopropyl alcohol reported in all samples. The origin of these alcohols is not known but based on the uniform concentrations and universal presence they are not site related.

Total petroleum related volatile organic compounds were generally low ranging from 24 µg/m^3 in ZBSG3 located near the southwest corner of the lot to 4 µg/m^3 in ZCSG3 located in the west central area of the building. Petroleum VOCs were also low in the indoor air samples ranging from 6 to 27 µg/m^3. The levels reported are consistent with general background concentrations observed throughout the Williamsburg area of Brooklyn.

Chlorinated VOCs (CVOCs) were reported in all soil gas samples at concentrations ranging from from 10 µg/m^3 in ZA-SG1 in the northeast corner of the lot to 19,000 µg/m^3 in PSG8 near the west central property line.

TCE was reported above the maximum sub-slab value of 50 µg/m^3 (above which monitoring is recommended) in eight perimeter locations (PSG2-PSG9) and nine interior soil gas locations (ZBSG1-3, ZCSG1-3, ZDSG1-3). PCE was reported at a maximum sub-slab value of 100 µg/m^3 (above which monitoring is recommended) in five of the perimeter locations only (PSG7-PSG11). PCE and TCE were not reported above air guidance values in any of the indoor air

samples. The highest concentration (by an order of magnitude) of PCE in soil gas was the P-SG8 location along the west property line in the southern half of the building (occupied warehouse). The highest concentrations of TCE in soil gas were also in the warehouse building along the east and south property lines. This distribution does not appear to correlate with PCE and TCE distribution in groundwater in which the highest concentrations were reported in the northeast corner of the property. Elevated levels of PCE and TCE were not reported within interior or perimeter soil gas locations within Zone A in the northwest corner of the building where the only detection of PCE in soil was reported. Therefore there also does not appear to be a correlation between PCE contamination in soil and that in soil gas.

In general, both PCE and TCE concentrations were higher in perimeter soil gas samples than they were in soil gas sampling points located within the interior area of the building. **Figure 14** shows posted soil gas results from the January sampling event while **Figure 15** shows posted results of soil gas, indoor and outdoor air results.

2.5.5.1 Summary of Soil Vapor Data

A table of soil vapor data collected prior to the remedy is shown in **Tables 34-35**. Further information on soil gas sample collection, handling and analysis can be found in the RI Report (EBC6/12).

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment under the BCP is to identify potential receptors to the contaminants of concern (COC) that are present at, or migrating from, the site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur. An exposure pathway has five elements; a contaminant source, release and transport mechanisms, point of exposure, route of exposure and a receptor population.

The potential exposure pathways identified below, represent both current and future exposure scenarios.

Contaminant Source

The source of the petroleum SVOCs and CVOCs detected in soil at the site is assumed to be related to a release of waste fuel oil contaminated with PCE near the loading dock in the northwest corner of the Building. However, low level SVOCs in groundwater appear to be related to background water quality in the area. CVOCs in soil gas and groundwater beneath the site are related to an off-site source. Impacted groundwater is migrating onto the site from the northeast. CVOCs in soil gas appear to be migrating onto the site along the west and southeast property lines.

Contaminant Release and Transport Mechanism

Impacted soil within the northwest source area does not appear to have contributed to CVOC and SVOC contaminant mass in groundwater. However, removal of contaminated soil from the source area is expected to eliminate potential further contribution to groundwater.

Although CVOCs present in on-site soil and / or groundwater may be volatilizing to air to some degree, there does not appear to be any correlation to CVOC contamination in soil and groundwater and that in soil gas. CVOCs are present at significant concentrations in soil gas in some areas of the property, however, and represent a potential vapor intrusion concern for the new buildings to be constructed on the site. Indoor air testing within the occupied warehouse portion of the existing building on-site did not indicate any CVOC vapor intrusion. CVOCs in soil gas on Site may either be related to impacted groundwater or an off-site source.

Point of Exposure, Route of Exposure and Potentially Exposed Populations

Potential On-Site Exposures: Remediation workers and construction workers engaged in the excavation of impacted and non-impacted soil at the site may be exposed to SVOCs and CVOCs through several routes. Workers excavating impacted soil may be exposed to SVOCs, CVOCs, heavy metals and pesticides through inhalation, ingestion and dermal contact. Workers

excavating non-impacted soil may be exposed to CVOCs in soil gas through inhalation. A site specific Health and Safety Plan has been developed to identify and minimize the potential hazards to on-site workers.

Under a future scenario, residents within the proposed buildings may be exposed to vapor intrusion if remediation of the source area is not completed, and if preventive measures are not incorporated into the new building design to protect against vapors migrating onto the site from an off-site source. This potential route of exposure will be reduced in response to the degree and success of source area remediation. However, vapor intrusion originating from off-site sources may continue to pose a threat if preventive measures are not taken.

Potential Off-Site Exposures: The entire area is serviced by the New York City Water System which distributes water from the Croton Reservoir system. Since there are no public or private potable supply wells in the area, exposure from contact with tap water is not a concern. Off-site exposure is therefore limited to vapor intrusion from CVOCs migrating from the site. Since there is no significant source of CVOCs in soil or groundwater on-site, the potential for off-site exposure associated with on-site contaminants is minimal.

However, potential off-site exposure related to vapor intrusion from an off-site CVOC source is a concern. The potentially exposed population in this case would include residents and commercial workers in buildings located both upgradient and downgradient of the site. Off-site exposure from CVOCs in groundwater to indoor air would be expected to be greater to commercial properties located west of the site and residential properties located southeast of the site where concentrations in soil gas were highest at the property line.

2.6.2 Fish & Wildlife Remedial Impact Analysis

Since CVOCs and / or low level SVOCs in shallow groundwater may be leaving the site at low concentrations in an westerly direction, the groundwater to surface water discharge pathway was evaluated. The East River is located approximately 450 feet west (downgradient of the Site). Groundwater samples collected on an adjacent downgradient property (472 Kent Avenue) did not identity CVOCs in groundwater on the property. Based on the absence of CVOC

contaminants migrating onto the adjacent downgradient property, there are no expected impacts to surface water environments from contaminants migrating beneath the Site.

2.7 REMEDIAL ACTION OBJECTIVES

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

2.7.1 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.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.7.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- 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.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.7.3 Soil Vapor

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

3.0 ALTERNATIVES ANALYSIS

The goal of the remedy selection process under the BCP is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of NYSDEC standards, criteria and guidance values (SCGs). A remedy is then developed based on the following nine criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. This analysis was prepared in accordance with 6 NYCRR Part 375-1.8(f) and Part 375-3.8(f) and Section 4.3(c) of NYSDEC DER-10. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

- Alternative 1 - Track 1, remediation of all soils above bedrock to unrestricted use criteria. Excavation to a minimum depth of 2 to 12 feet across both parcels with the excavation of several hot spot areas to a depth of 15 feet. This alternative does not allow the use of long-term institutional /engineering controls to address impacted media or prevent exposures which may be required beneath the buildings on one or both parcels.

- Alternative 2 - Track 2, remediation of all soils to restricted residential criteria to a depth of 15 feet if soils below 15 feet do not represent a source of contamination. This alternative would require a lesser degree of over-excavation than Alternative 1 and would limit the excavation of hot spot areas to 15 feet. Alternative 2 includes the installation of a vapor barrier and sub-slab depressurization system beneath the portion of the basement level of the new buildings which will not have mechanical ventilation. This alternative does not allow the use of long-term institutional /engineering controls to meet soil cleanup objectives. Long-term institutional /engineering controls are allowed to address or prevent exposures from other impacted media. This alternative is provided as a contingency in the event that Track 1 SCOs cannot be met or if long term operation of the SSDS systems is required beneath the buildings of one or both parcels.

- Alternative 3 - Track 4, would include excavation / remediation of the petroleum-CVOC hotspot area but would limit the excavation of historic fill to that which is required to construct the basement level foundations of the new buildings. The Track 4 alternative will allow the use of site specific SCOs for remaining fill materials to avoid over-excavation. This will result in some metals above restricted residential SCOs to remain in soil at depth beneath the basement slabs on one or both parcels. This alternative also includes the installation of a vapor barrier and sub-slab depressurization system beneath the basement levels of the new building which will not have continuous mechanical ventilation.

3.1 REMEDIAL ALTERNATIVE 1

The following sections provide an evaluation of Alternative 1 based on the nine evaluation criteria as previously discussed.

3.1.1 Overall Protection of Human Health and the Environment

Alternative 1 will be protective of human health and the environment by eliminating the SVOC and CVOC concentrations present in all subsurface affected soils at the site and by eliminating constituents in soil related to historic fill. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of all historic fill soils and hot spot

areas with parameters in excess of unrestricted criteria, disposing of excavated materials off-site and backfilling as needed with certified clean fill, virgin mined materials or recycled concrete materials from a NYSDEC permitted recycling facility.

Potential post-remediation exposures to on-site residents from soil vapors are not expected to require the long term (>5 yrs) operation of SSDS systems, though groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a Health and Safety Plan. Exposures to area residents from dust and/or vapors will be minimized through the use of engineering controls and through implementation of a Community Air Monitoring Plan (CAMP).

3.1.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to Track 1 unrestricted cleanup levels. SCGs for groundwater may not be achieved as impacted groundwater has been shown to be migrating on to the Site. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.1.3 Long-Term Effectiveness and Permanence

Alternative 1 achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants or historic fill materials. Under this Alternative, risk from soil impacts is eliminated though risk from groundwater will remain unless the off-site source is identified and remedied. Alternative 1 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.1.4 Reduction in Toxicity, Mobility or Volume Through Treatment

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting unrestricted objectives. The removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.1.5 Short-Term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 1 is minimal.

Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic, will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities, will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan has also been prepared to minimize disturbance to the local roads and community.

3.1.6 Implementability

The techniques, materials and equipment to implement Alternative 1 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

3.1.7 Cost

Costs associated with Alternative 1 are estimated at approximately $4,591,432. This cost estimate includes the following elements and assumptions:

- Excavate as per the basement foundation plans for the new buildings. Over-excavate as necessary to remediate hot-spot areas and remove all historic fill at the Site.

- Disposal of approximately 555 cy of soil from the CVOC-petroleum spill area as non-hazardous through a contained-in determination;
- Disposal of approximately 29,600 cy of historic fill soil as non-hazardous;
- On-site reuse of approximately 10,000 cy of clean native soil
- Disposal of approximately 5,575 cy of clean native soil for beneficial reuse
- Shoring using wood lagging and sloping;
- Installation and temporary operation (<5 yrs) of a Sub Slab Depressurization System (SSDS) beneath new construction;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.1.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential zoning. Following remediation, the Site will meet unrestricted use objectives which will exceed the objectives for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.1.9 Community Acceptance

No questions regarding the Site have been raised regarding remedial options to date. This RAWP has been subject to a 45-day public comment period to determine if the community had comments on the presented remedial alternatives and selected remedy. Since no comments were received regarding Alternative 1, it is considered to be acceptable to the community.

3.2 REMEDIAL ALTERNATIVE 2

The following sections provide an evaluation of Alternative 2 based on the nine evaluation criteria as previously discussed.

3.2.1 Overall Protection of Human Health and the Environment

Alternative 2 will be protective of human health and the environment by eliminating the SVOC and CVOC concentrations present in subsurface soils above restricted residential criteria at the Site and by eliminating constituents related to historic fill above restricted residential criteria to a depth of 15 feet. The potential for human and environmental exposure to these constituents on-

site will be eliminated by excavation of all soils with parameters in excess of restricted residential criteria to a depth of 15 feet, disposing of excavated materials off-site and backfilling as needed with certified clean fill, virgin mined materials or recycled concrete materials from a NYSDEC permitted recycling facility.

Potential post-remediation exposures to on-site residents from soil vapors would be addressed through the use of a vapor barrier and a SSDS beneath basement levels which are not required to be equipped with mechanical ventilation (parking garage). Groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity, workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a HASP. Exposures to area residents from dust and or vapors will be minimized through the use of engineering controls and through implementation of a CAMP.

3.2.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 2 will achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to restricted residential cleanup levels for the top 15 feet. SCGs for groundwater may not be achieved as impacted groundwater has been shown to be migrating on to the Site. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.2.3 Long-term Effectiveness and Permanence

Alternative 2 achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants above restricted residential objectives to a depth of 15 feet. Under this Alternative risk from soil impacts is eliminated for on-site residents. Alternative 2 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.2.4 Reduction in Toxicity, Mobility or Volume through Treatment

Alternative 2 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting restricted residential objectives in the upper 15 feet. The

removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.2.5 Short-term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 2 is minimal. Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan will also be prepared to minimize disturbance to the local roads and community.

3.2.6 Implementability

The techniques, materials and equipment to implement Alternative 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

3.2.7 Cost

Costs associated with Alternative 2 are estimated at approximately $4,398,002. This cost estimate includes the following elements and assumptions:

- Excavate as per the basement foundation plans for the new buildings. Over-excavate as necessary to remediate hot-spot areas and remove historic fill above restricted residential objectives in the top 15 feet at the Site.

- Disposal of approximately 555 cy of soil from the CVOC-petroleum spill area as non-hazardous through a contained-in determination;
- Disposal of approximately 28,600 cy of historic fill soil as non-hazardous;
- On-site reuse of approximately 10,000 cy of clean native soil
- Disposal of approximately 5,575 cy of clean native soil for beneficial reuse
- Shoring using wood lagging and sloping;
- Installation and temporary operation of a Sub Slab Depressurization System (SSDS) beneath new construction;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.2.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential zoning Following remediation the Site will meet restricted residential use objectives which is appropriate for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.2.9 Community Acceptance

No questions regarding the Site have been raised regarding remedial options to date. This RAWP has been subject to a 45-day public comment period to determine if the community had any comments on the presented remedial alternatives and selected remedy. Since no comments were received, it is considered to be acceptable to the community.

3.3 REMEDIAL ALTERNATIVE 3

The following sections provide an evaluation of Alternative 3 based on the nine evaluation criteria as previously discussed.

3.3.1 Overall Protection of Human Health and the Environment

Alternative 3 will be protective of human health and the environment by eliminating the SVOC and CVOC concentrations present in subsurface soils above restricted residential criteria by eliminating constituents related to historic fill in accordance with the planned construction of the Site. The potential for human and environmental exposure to these constituents on-site will be

eliminated by the excavation of all soils with VOC/SVOC parameters above restricted residential criteria within the petroleum-CVOC hot spot area and the removal of historic fill soils to a minimum depth of 8 ft across the Site. Residual fill with parameters above restricted residential criteria will be effectively capped with the concrete foundation slab of the new buildings.
Potential post-remediation exposures to on-site residents from soil vapors would be addressed through the use of a vapor barrier and a SSDS beneath basement levels which are not required to be equipped with mechanical ventilation (parking garage). Groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a HASP. Exposures to area residents from dust and/or vapors will be minimized through the use of engineering controls and through implementation of a CAMP.

3.3.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 3 will achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to restricted residential and site specific cleanup levels. SCGs for groundwater may not be achieved as impacted groundwater has been shown to be migrating on to the Site. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.3.3 Long-term Effectiveness and Permanence

Alternative 3 achieves long term effectiveness and permanence by permanently removing and/or remediating petroleum-CVOC hot spot areas and by removing historic fills to a minimum depth of 8 feet below grade. Under this Alternative, risks from soil impacts are eliminated for on-site residents. Alternative 3 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.3.4 Reduction in Toxicity, Mobility or Volume through Treatment

Alternative 3 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by remediating petroleum-CVOC hot spot areas and by removing historic fills to a

minimum depth of 8 feet below grade. The removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.3.5 Short-term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 3 is minimal.

Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan will also be prepared to minimize disturbance to the local roads and community.

3.3.6 Implementability

The techniques, materials and equipment to implement Alternative 3 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

3.3.7 Cost

Costs associated with Alternative 3 are estimated at approximately $4,398,002. This cost estimate includes the following elements and assumptions:

- Excavate as per the basement foundation plans for the new buildings.
- Disposal of approximately 555 cy of soil from the CVOC-petroleum spill area as non-hazardous through a contained-in determination;
- Disposal of approximately 28,600 cy of historic fill soil as non-hazardous;
- On-site reuse of approximately 10,000 cy of clean native soil
- Disposal of approximately 5,575 cy of clean native soil for beneficial reuse
- Shoring using wood lagging and sloping;
- Installation and temporary operation of a Sub Slab Depressurization System (SSDS) beneath new construction;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.3.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R5 residential zoning (with C2-3 commercial overlay). Following remediation, the Site will meet restricted residential use objectives which is appropriate for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.3.9 Community Acceptance

No questions regarding the Site have been raised regarding remedial options to date. This RAWP has been subject to a 45-day public comment period to determine if the community had any comments on the presented remedial alternatives and selected remedy. Since no comments were received regarding the remedy, it is considered to be acceptable to the community.

4.0 DESCRIPTION OF REMEDIAL ACTION PLAN

4.1 EVALUATION OF REMEDIAL ALTERNATIVES

The goal of the remedy selection process under the BCP is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing remedial action objectives (RAOs) for media in which chemical constituents were found in exceedance of NYSDEC standards, criteria and guidance values (SCGs). A remedy is then developed based on the following nine criteria:

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidelines (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

4.2 STANDARDS, CRITERIA AND GUIDANCE (SCG)

A criterion for remedy selection is evaluation for conformance with SCGs that are applicable, relevant and appropriate. Principal SCGs that are applicable, relevant and appropriate for evaluating the alternatives for remediation of this BCP site include the following:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 10 NYCRR Part 67 – Lead
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)

- 6 NYCRR Part 375 - 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1, 375-3 and 375-6 (December 2006)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")
- 6 NYCRR Part 375-6 Soil Cleanup Objectives
- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1;
- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation - May 2010;
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364.
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- DER-10, Technical Guidance for Site Investigation and Remediation, May 2010
- DER-23 / Citizen Participation Handbook for Remedial Programs, January 2010
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)

Additional regulations and guidance are applicable, relevant, and appropriate to the remedial alternatives and will be complied in connection with implementation of the remedial program; however, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the BCP site.

Conformance with the appropriate standards for remediation of contaminated soil is an important criterion in evaluating the remedial alternatives for the BCP site. Presently, in New York State 6 NYCRR Part 375 establishes the primary SCGs associated with remediation of contaminated soil at sites which are in the BCP. If proposing remediation pursuant to a Track other than Track 1 (Unrestricted Use), 6 NYCRR Part 375 requires evaluation of at least one remedial alternative pursuant to Track I (Unrestricted Use) and one other alternative developed by the applicant for the proposed use of the BCP site. The remedial alternatives presented in Section 3.3 of this work plan have been prepared in conformance with this requirement.

4.3 SELECTION OF THE PREFERRED REMEDY

The remedy recommended for the site is a Track 1 alternative which consists of the removal of all petroleum and CVOC contaminated soil within the northwest "hotspot" area through excavation. Isolated "hotspot" areas with elevated levels of chromium and / or nickel and / or silver and / or manganese extending to a depth of 15 feet, would also be excavated and removed from the Site. In addition all fill material with parameters above unrestricted SCOs will be removed from the Site and properly disposed of at an off-site facility.

Overall Protection Of Public Health And The Environment

The recommended remedial action achieves protection of the public health and the environment by eliminating the an identified release area with elevated concentrations of SVOCs and CVOCs in soil which will eliminate or significantly reduce the potential for vapor intrusion in the new building and prevent the potential for contamination of groundwater and off-site migration of impacted groundwater originating on the property. The recommended action further achieves protection of the public health and the environment by eliminating constituents in surficial soils related to historic fill. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of the all soils with parameters in excess of unrestricted criteria, disposing of excavated materials off-site and backfilling as needed with certified clean fill/topsoil. Although affected groundwater would not directly affect human health, groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a Health and Safety Plan. Exposures to area residents from dust and/or vapors will be minimized through the use of engineering controls and through implementation of a Community Air Monitoring Plan (CAMP).

The remedy will meet all of the RAOs established for soil and groundwater at the site.

Compliance with Standards, Criteria and Guidance

The recommended remedial action meets the objectives of the RAOs by removing the potential for human and environmental exposures to chemical constituents above SCGs in soil and groundwater. The proposed action will effectively remove the source area and all historic fill soils resulting in compliance with SCGs for soils.

Long-term Effectiveness and Permanence

The remedial action achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants or historic fill materials. Bulk reductions in groundwater contamination may not be achieved if all or some portion of the impacts are related to an off-site source. However, groundwater improvement is expected if impacts are related to on-site sources. Bulk reduction in groundwater impacts related to the removal of soils under the remedial action will also be permanent. Under this remedy, risk from soil impacts is eliminated and risk from site-related groundwater impacts significantly reduced. The selected remedy will continue to meet RAOs for soil and groundwater in the future, providing a permanent long-term solution for the Site.

Reduction of Toxicity, Mobility and Volume

The recommended action will reduce the toxicity, mobility and volume of the chemical constituents by removing the source area of contamination and meeting unrestricted objectives for on-site soil. The removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site groundwater and soil vapor.

Short-term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 1 is minimal.

Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic, will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities, will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan will also be prepared to minimize disturbance to the local roads and community.

Implementability

The techniques, materials and equipment to implement Alternative 1 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites. No issues related to the design, availability or implementation of the selected remedy are anticipated.

Cost

Costs associated with the selected remedy are estimated at approximately $ 4,591,432. This cost estimate includes the following elements and assumptions:

- Building demolition and Site Preparation

- Remove and excavate petroleum / CVOC impacted soil from a 1,500 sf area to a depth of 16 feet.
- Remove and excavate isolated areas with individual metals exceedances to a depth of 16 feet
- Excavate all historic fill material across both parcels as necessary for building construction and as needed to meet Track 1 SCOs.
- Proper characterization and disposal of excavated soil as nonhazardous or hazardous;
- Endpoint sampling to verify SCOs;
- HASP and CAMP monitoring for the duration of the remedial activities.

Community Acceptance

Public participation plays a large role in the BCP process. A fact sheet has been prepared and sent out to all interested parties as identified in the site contact list. A draft version of this document was placed in a local repository (NYSDEC Region 2 office and the Leonard Street Branch of the Brooklyn Public Library,) and made available for public review and comment for a period of 45 days. No questions regarding the Site were raised regarding the proposed remedial action. The RAWP was subject to a 45-day public comment period to determine if the community has comments on the selected remedy. No comments were received regarding this remedy.

Compatibility with Land Use

The proposed remedy will not prevent or otherwise interfere with the intended and planned future use of the site. The proposed redevelopment of the Site is compatible with its current R7A residential zoning. Following remediation, the Site will meet unrestricted use objectives which will exceed the objectives for its planned multi-tenant residential use. A groundwater use restriction may be required to prevent future exposure to affected groundwater.

4.3.1 Preferred Remedy Land Use Factor Evaluation

As required by Article 27, Title 14 of the Environmental Conservation Law 27-1415, the following land use factor evaluation examines whether the preferred alternative is acceptable based on the 14 criteria presented in the following subsections.

Zoning

The proposed redevelopment project, which includes the construction of sixteen 7-story residential apartment buildings is in compliance with the R7A residential zoning. Therefore the project will be constructed as-of-right regardless of the remedy implemented. The preferred remedy will comply with current zoning.

Applicable Comprehensive Community Master Plans Or Land Use Plans

The proposed redevelopment project and selected remedy are consistent with comprehensive master and land use plans, specifically the Greenpoint-Williamsburg rezoning action. This area-wide comprehensive re-zoning, completed by the New York City Department of City Planning and adopted by the City Council in May 2005, re-zoned the property from manufacturing to residential use. The preferred remedy will comply with applicable land use plans.

Surrounding Property Uses

The surrounding land use includes new multi-family residential buildings to the north, a new multi-use commercial / residential development to the northwest, an underutilized commercial property to the west, residential buildings to the east and older commercial / industrial properties to the south. In general the area was historically characterized by heavy industrial and commercial properties. The area has been changing in response to the upzoning and many of the industrial/commercial buildings are being converted to, or replaced by, new residential buildings and schools. The proposed remedy will not interfere with surrounding property uses and considers the short term affects to neighboring residences.

Citizen Participation

Citizen participation for implementation of the preferred alternative will be performed in accordance with DER 23 and NYCRR Part 375-1.10 and Part 375-3.10. A Citizen Participation Plan has been prepared and is available for public review at the identified document repositories (NYSDEC Region 2 Office, Leonard Street Branch of the Brooklyn Public Library).

Environmental Justice Concerns

The Site is located within, or partially within, a potential environmental justice area. The

NYSDEC defines a potential environmental justice area as a "minority or low-income community that may bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies".

Environmental justice means the fair treatment and meaningful involvement of all people regardless of race, color, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. Since the goal of the remedy will achieve the highest level of cleanup and will remove contaminated materials from the community, the remedy poses no environmental justice concerns.

Land use designations

The proposed remedy is consistent with land-use designations.

Population growth patterns

Population growth patterns support the proposed use for the Site. The preferred remedy will not negatively affect on population growth patterns.

Accessibility to existing infrastructure

The Site is accessible to existing infrastructure. The close proximity of the Site to Kent and Wythe Avenues, the Brooklyn-Queens Expressway and the Long Island Expressway will assist soil transportation and contractor access to the Site. The Site is also accessible to mass transit and is within walking distance to bus and subway stops on Broadway. The preferred remedy will not alter accessibility to existing infrastructure.

Proximity to cultural resources

The proposed remedy will not negatively impact cultural resources

Proximity to natural resources

The proposed remedy will improve the local environment and will not negatively impact affect natural resources.

Off-Site groundwater impacts

The proposed remedy will improve off-site groundwater impacts by removing a source of groundwater contamination at the site. The proposed remedy will not affect natural resources other than to improve the quality of groundwater on a local basis.

Proximity to floodplains

The site is in close proximity to a flood zone to the west. The nearest moderate risk flood zone is located 150 feet to the west and the nearest high risk flood zone is located 350 feet to the west The remedy will not be negatively affected by the proximity to a zone X flood zone.

Geography and geology of the Site

The selected remedy will excavate soil from the Site to a depth of 5 to 15 feet. Redevelopment will also remove soils to a depth of 12 feet for the basement levels of the new building. The selected alternative and development of the site have considered the geography and geology of the Site.

Current Institutional Controls

The Site was assigned an E-designation for hazardous materials as part of the rezoning action completed by the City. The compliance with the E-designation for hazardous materials will require the approval of the NYC Office of Environmental Remediation (NYCOER) of this RAWP. NYCOER must approve this RAWP in the form of a Notice to Proceed (NTP) letter before building permits will be released by the NYC Department of Buildings (DOB). Documentation in the form of a Final Engineering Report (FER) for site remediation must be approved by NYCOER in the form of a Notice of Satisfaction (NOS) before the NYCDOB will issue permanent Certificates of Occupancy for the new buildings.

4.4 SUMMARY OF SELECTED REMEDIAL ACTIONS

The remedy recommended for the Site consists of the removal of all petroleum and CVOC contaminated soil from a "hotspot" area in the northeast corner of the site and the removal of several isolated areas with individual metals above unrestricted criteria. In addition all fill material with parameters above unrestricted SCOs will be removed from the Site and properly disposed of at an off-site facility. The remedy will include the following items:

1. Removal of petroleum and CVOC impacted soil from an approximate 1,500 sf area in the northwest corner of the property.
2. Removal of chromium, silver, nickel and manganese impacted soils from several isolated areas at the site.
3. Excavation of soil/fill exceeding Track 1 SCOs listed in **Table 1**; Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
4. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs;
5. 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;
6. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in **Table 1**, (2) all Federal, State and local rules and regulations for handling and transport of material.
7. Installation of a sub-slab depressurization system and vapor barrier beneath occupied areas of the building to be constructed on the Site.
8. If Track 1 SCOs are not achieved, a composite cover system consisting of the concrete building slab will be constructed.
9. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
10. An Environmental Easement will be filed against the Site to ensure implementation of the SMP. The environmental easement for implementation of the SMP must be extinguished within 5 years to attain a Track 1 Cleanup.

Although the goal of the remedy will be to remove all soil exceeding the Track 1 SCOs on both parcels, the need for an SSDS may result in a Track 2 remedy on one or both parcels if operation is required to continue beyond 5 years. Likewise, if Track 1 SCOs cannot be achieved on one or both parcels then a Track 2 or Track 4 remedy may result on one or both parcels.

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

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

5.0 REMEDIAL ACTION PROGRAM

The objective of this section of the Remedial Action Work Plan, is to present a scope of work which will be approved by NYSDEC and when completely implemented will ready the BCP site for development under the Contemplated Use, which is unrestricted use, consistent with the requirements of the Brownfield Cleanup Program. Additionally, following completion of the remedial activities and subject to any groundwater monitoring that may be required, it is an objective of this remedy that Clean Zones will be prepared beneath buildings, courtyards, and utility corridors so that construction can be implemented without the need for OSHA Hazardous Waste Operations and Emergency Response ("HAZWOPER") training for construction workers. The establishment of Clean Zones was previously completed under an IRM and construction of the new building is currently underway.

5.1 GOVERNING DOCUMENTS

Governing documents and procedures included in the Remedial Work Plan include a Site-specific Health and Safety Plan (HASP), a Community Air Monitoring Plan (CAMP), a Citizen Participation Plan, a Soil Management Plan (SoMP) analytical quality assurance/quality control (QAlQC), fluid management procedures, a Storm Water Pollution Prevention Plan SWPPP, and contractors' site operations and quality control procedures. Highlights of these documents and procedures are provided in the following sections.

5.1.1 Health & Safety Plan (HASP)

Governing documents and procedures included in the Remedial Work Plan include a Site-specific Health and Safety Plan (HASP), a Community Air Monitoring Plan (CAMP), a Citizen Participation Plan, a Soil Management Plan (SoMP) analytical quality assurance/quality control (QAlQC), fluid management procedures, a Storm Water Pollution Prevention Plan SWPPP, and contractors' site operations and quality control procedures. Highlights of these documents and procedures are provided in the following sections.

Contractors and subcontractors will have the option of adopting this HASP or developing their own site-specific document. If a contractor or subcontractor chooses to prepare their own HASP,

the Project Remedial Engineer will insure that it meets the minimum requirements as detailed in the site HASP prepared by EBC and must be made submitted to and approved by the NYSDEC. Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926. Modifications to the HASP may be made with the approval of the Project Remedial Engineer (RE), Site Safety Manager (SSM) and/or Project Manager (PM).

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The Health and Safety Plan (HASP) and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Site Safety Coordinator will be Mr. Kevin Waters. A resume will be provided to NYSDEC prior to the start of remedial construction. Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses. A copy of the Site Specific Health and Safety Plan is provided in **Attachment C.**

5.1.2 Quality Assurance Project Plan (QAPP)

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or a cold-pak(s) to maintain a temperature of 4^{o}C.

Dedicated disposable sampling materials will be used for both soil and groundwater samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with alconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks by poring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will be upgradeable to ASP category B deliverables for use in the preparation of a data usability report (DUSR). The QAPP for the Site is provided in **Attachment D**.

5.1.3 Construction Quality Assurance Plan (CQAP)

All construction work related to the remedy (i.e. soil excavation) will be monitored by EBC field personnel under the direct supervision of the Remedial Engineer. Monitoring during soil excavation will be performed to protect the health of site workers and the surrounding community. A Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP)

have been specifically developed for this project. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health.

All intrusive and soil disturbance activities will be monitored by a qualified environmental professional (QEP) under the direct supervision of the Remedial Engineer who will record observations in the site field book and complete a photographic log of the daily activities. The QEP will provide daily updates to the Project Manager and Remedial Engineer who will both make periodic visits to the site as needed to assure construction quality.

5.1.4 Soil/Materials Management Plan (SoMP)

An SMP was prepared for excavation, handling, storage, transport and disposal of all soils/materials that are disturbed/excavated at the Site. The SMP includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The SMP developed for this site is presented in **Section 4.5** of this RAWP.

5.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

Erosion and sediment controls will be performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Typical measures that will be utilized at various stages of the project to limit the potential for erosion and migration of soil include the use of hay bales, temporary stabilized construction entrances/exits, placement of silt fencing and/or hay bales around soil stockpiles, and dust control measures. The SWPPP is appended to this RAWP as **Attachment E**.

5.1.6 Community Air Monitoring Plan (CAMP)

The CAMP provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities.

The action levels specified require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary concerns for this site are vapors, nuisance odors and dust particulates. A CAMP was previously prepared for implementation of the RAWP and is provided in **Attachment F**.

5.1.7 Contractors Site Operations Plan (SOP)

The Remedial Engineer has reviewed all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirms 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 sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

5.1.8 Citizen Participation Plan (CPP)

A certification of mailing will be sent by the Volunteer 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 of 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 provided in **Attachment G**.

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

Brooklyn Public Library
Leonard Street Branch
81 Devoe Street
Brooklyn, NY 11211
(718) 486-3365

Hours:
Mon 10:00 AM - 6:00 PM
Tue 1:00 PM - 8:00 PM
Wed 10:00 AM - 6:00 PM
Thu 10:00 AM - 6:00 PM
Fri 10:00 AM - 6:00 PM
Sat 10:00 AM - 5:00 PM
Sun closed

5.2 GENERAL REMEDIAL ACTION INFORMATION

5.2.1 Project Organization

The Project Manager for the Remedial Activity will be Mr. Kevin Brussee. Overall responsibility for the BCP project will be Mr. Charles B. Sosik, P.G., P.HG. The Remedial Engineer for this project is Mr. Ariel Czemerinski, P.E.. Resumes of key personnel involved in the Remedial Action are included in **Attachment H**.

5.2.2 Remedial Engineer

The Remedial Engineer for this project will be Mr. Ariel Czemerinski, P.E. 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 Former Domsey Fiber Corp Site (NYSDEC BCP Site No. C224158). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his 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 in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Remediation Report. The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

5.2.3 Remedial Action Schedule

Due to the size of the Site, remedial activity will be performed in 2 stages to coordinate with site redevelopment. Stage 1 will include the demolition of the entire building on the northern half of the property from existing private road, S. 9th Street, to the planned private road, S. 10th Street. Hot spot areas will then be removed and the property excavated to final construction grade. Installation of the building foundation will be performed in conjunction with construction excavation.

Stage 1 building demolition is currently underway and is expected to be completed in six weeks. The remedial action will begin with mobilization of equipment and material to the Site which will begin approximately 2 weeks following RAWP approval and within 10 days of the distribution of the Construction Fact Sheet. Mobilization will be followed by removal of the petroleum – CVOC hot spot area and confirmation sampling. This work is expected to take 2 weeks. Excavation and disposal of historic fill materials will be begin following the hotspot removal and is expected to continue for 12 to 18 weeks as part of the construction excavation and foundation installation.

Stage 2 would follow a similar timeline with building demolition beginning in early 2014.

5.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that

agency. DEC will be notified by the Applicant of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

5.2.5 Site Security

A construction fence will be erected around the entire property as required by the NYC Department of Buildings. The fence will be maintained as required and secured at the end of each work day.

5.2.6 Traffic Control

Traffic will enter and exit the site through gates to be installed in a construction fence along Wythe and Kent Avenues. The Volunteer's construction management personnel will direct the arrival or departure of construction vehicles, and provide flag services as needed to maintain safe travel exiting and entering the site from Wythe Avenue. Traffic related to on-going remedial activity will require the staging of 10-wheel dump trucks along Wythe Avenue and / or S. 9th Street (private road) on a daily basis during soil excavation activity. The Site is large enough to stage trucks on-site if necessary. The soil disposal transport route will be as follows: ENTERING SITE - from the Brooklyn Queens Expressway head northwest on Kent Avenue (one-way) approximately ¾ miles to the Site entrance on the right. EXITING SITE – turn right onto Wythe Avenue (one-way) heading southeast ¾ miles to the Brooklyn Queens Expressway overpass. Go under the overpass and turn left heading north on Penn Street (one-way). Bear left onto the Brooklyn-Queens Expressway on-ramp. A map showing the truck routes is included as **Figure 16**.

5.2.7 Worker Training and Monitoring

An environmental remediation contractor with appropriate hazardous material handling experience and training is required to perform the excavation of petroleum - CVOC impacted soil. After the contaminated soil is removed and the remediation contractor has demobilized from the Site, an excavation contractor will remove historic fill and uncontaminated soil. The excavation contractor's on-site personnel will have a minimum of 24 hour Hazardous Waste Operations and Emergency Response Operations training.

All field personnel involved in remedial activities will participate in training, if required under 29 CFR 1910.120, including 24 and 40-hour hazardous waste operator training and annual 8-hour refresher training. The Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment.

All on-site personnel engaged in remedial or sampling activities must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

5.2.8 Agency Approvals

The Applicant has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is attached in **Table 36**. 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 Final Remediation Report.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

5.2.9 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager and contained in **Attachment I**.

5.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting with the Project Manager, Remedial Engineer, Construction Manager, Owner's Representative and the NYSDEC will take place prior to the start of major construction activities.

5.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in **Table 37**. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

5.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action is $ 4,591,432. An itemized and detailed summary of estimated costs for all remedial activity is attached as **Attachment J**. This will be revised based on actual costs and submitted as an Appendix to the Final Remediation Report.

5.3 SITE PREPARATION

5.3.1 Mobilization

Mobilization will include the delivery of construction equipment and materials to the site. All construction personnel will receive site orientation and training in accordance with the site specific HASP, CAMP and established policies and procedures to be followed during the implementation of the RAWP. The remediation contractor, construction manager and all associated subcontractors will each receive a copy of the RAWP and the site specific HASP and will be briefed on their contents.

5.3.2 Erosion and Sedimentation Controls

Soil erosion and sediment control measures for management of storm water will be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Haybales and/or silt fence will be placed by the remedial contractor at locations surrounding excavation areas and within the perimeter fencing as needed, to control stormwater runoff and surface water from exiting the excavation. These control measures will be installed prior to initiating the soil excavation.

5.3.3 Stabilized Construction Entrance(s)

Stabilized construction entrances will be installed at all points of vehicle ingress and egress to the Site. The stabilized entrances will be constructed of a 4 to 6-inch bed of crushed stone or crushed concrete which will be sloped back toward the interior of the Site. The stabilized entrances will be inspected on a daily basis during soil loading activities and reinforced as needed with additional stone/concrete material to prevent the accumulation of ruts, mud or soil.

5.3.4 Utility Marker and Easements Layout

The Applicant and its contractors are solely 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 Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant 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 satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

5.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of the Applicant and its contractors. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Applicant and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Applicant and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

5.3.6 Equipment and Material Staging

All equipment and work materials will be staged on-Site in areas as designated by the General Contractor, and / or Construction Site Superintendant.

5.3.7 Decontamination Area

A temporary truck decontamination pad will be constructed to decontaminate trucks and other vehicles/equipment leaving the Site. The pad will be constructed by placing a stone aggregate

such as crushed rock or concrete over a 20-mil high density polyethylene (HDPE) liner. The pad will be bermed at the sides and sloped back to the interior of the Site. The truck pad will be sized to accommodate the largest construction vehicle used and located in line with the stabilized construction entrance.

5.3.8 Site Fencing

An 8-foot high temporary construction fence will be installed around the perimeter of the Site with entrance gates located on Wythe Avenue, Kent Avenue and S. 9th Street. This fence will be properly secured at the end of the day and supplemented, as needed, by installing orange safety fencing around open excavations to ensure on-site worker safety.

5.3.9 Demobilization

Demobilization will consist of the restoration of material staging areas and the disposal of materials and/or general refuse in accordance with acceptable rules and regulations. Materials used in remedial activities will be removed and disposed properly. All equipment will be decontaminated prior to leaving the Site.

5.4 REPORTING

All daily and monthly Reports will be included in the Final Engineering Report.

5.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day in which remedial activity takes place. Daily reports will include:

- An update of progress made during the reporting day;
- Quantities of oxidant material applied at specific injection locations of the Site;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable Site conditions.

Daily 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. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

5.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the 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. 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.

5.4.3 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 submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's

Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

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.

5.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions including noise, odor, truck traffic etc., will be recorded in the Site field book and reported to the NYSDEC in the daily status report.

5.4.5 Deviations from the Remedial Action Work Plan

Minor deviations from the RAWP will be identified in the daily update report and will be noted in the Final Engineering Report. When deviations are reported a brief discussion will be provided which will state the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy.

Major changes to the scope of work must be discussed with the NYSDEC and the NYSDOH prior to implementation. If the changes are considered to be significant enough, an addendum to the RAWP Work Plan will be prepared and submitted to NYSDEC / NYSDOH for review.

6.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Excavation work includes the removal of petroleum and CVOC impacted soil within the northwest corner of the Site, several isolated "hotspot" areas with elevated metals, historic fill materials which are present through out the site and native soils which will be removed to accommodate the basement level of the new buildings, elevator pits, and foundation structures. Soil excavation will be performed using conventional equipment such as track-mounted excavators, loaders and bulldozers.

All excavation work will be performed in accordance with the Site-specific HASP and CAMP. Removal of the UST and petroleum impacted soil will be performed by a qualified remedial contractor and fully trained personnel (40HR OSHA HAZWOPER). If an underground storage tank (UST) is discovered during excavation the NYSDEC Project Manager will be immediately notified and the UST removed and closed in accordance with DER-10, NYSDEC PBS regulations and NYC Fire Department regulations. It is anticipated that the excavation of historic fill materials and native soils will be performed by the excavation contractor for the construction project.

The selected remedial action includes the excavation of soil within the identified petroleum-CVOC area and in isolated metal "hotspot" areas to a depth of approximately 15 feet or as needed to achieve SCOs. Historic fill materials will be excavated to a depth of approximately 2 to 12 feet throughout the Site or as needed to achieve SCOs. Excavation for the basement level parking areas and cellar levels of the new buildings will continue to a depth of approximately 12 feet. An excavation plan showing the excavation depths to achieve the Track 1 remedy is provided in **Figures 17-21**.

Dewatering is not anticipated for the excavation of contaminated areas or for foundation construction.

6.1 CONTINGENCY - UST REMOVAL METHODS

USTs, if encountered during excavation activities at the Site, will be removed in accordance with

the procedures described under the NYSDEC Memorandum for the Permanent Abandonment of Petroleum Storage Tanks and Section 5.5 of Draft DER-10 as follows:

- Remove all product to its lowest draw-off point
- Drain and flush piping into the tank
- Vacuum out the tank bottom consisting of water product and sludge
- Dig down to the top of the tank and expose the upper half of the tank
- Remove the fill tube and disconnect the fill, gauge, product and vent lines and pumps. Cap and plug open ends of lines
- Temporarily plug all tank openings, complete the excavation, remove the tank and place it in a secure location
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank
- Clean tank or remove to a storage yard for cleaning
- If the tank is to be moved it must be transported by licensed waste transported. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport
- After cleaning the tank must be made acceptable for disposal at a scrap yard cleaning the tank interior with a high pressure rinse and cutting the tank in several pieces.

During the tank and pipe line removal the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.)
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.)
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a calibrated photoionization detector (PID).

6.2 SOIL CLEANUP OBJECTIVES

The Soil Cleanup Objectives for this Site are listed in **Table 1**. **Table 24** summarizes all soil samples that exceed the SCOs proposed for this Remedial Action. A spider map that shows all soil samples that exceed the SCOs proposed for this Remedial Action are shown in **Figures 8-10**.

6.3 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

Post excavation soil samples will be collected from the petroleum-CVOC and metal hot spot area excavations and from the remainder of the site to verify that remedial goals have been achieved. Hotspot area samples will be collected immediately following the removal of all impacted soil and will be analyzed for the parameters of concern at each location VOCs / SVOCs or individual metals (chromium, silver, nickel and manganese). Construction excavation samples will be taken following the excavation of all fill materials and additional soil as needed to achieve final grade. Site-wide samples will be analyzed for those parameters that exceeded unrestricted SCOs in fill materials during the RI (SVOCs, metals).

6.3.1 End-Point Sampling Frequency

Endpoint sampling frequency will be in accordance with DER-10 section 5.4 which recommends the collection of one bottom sample per 900 sf of bottom area and one sidewall sample per 30 liner feet. Sidewall samples will not be collected where sheeting or shoring is present.

6.3.2 Methodology

Collected samples be placed in glass jars supplied by the analytical laboratory and stored in a cooler with ice to maintain a temperature of 4 degrees C. Samples will either be picked up at the Site by a laboratory dispatched courier at the end of the day or transported back to the EBC office where they will be picked up the following day by the laboratory courier. All samples will be analyzed by a NYSDOH ELAP certified environmental laboratory

All Verification samples will be analyzed for VOCs and SVOCs according to EPA method 8260 / 8270BN and TAL metals.

6.3.3 Reporting of Results

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format.

6.3.4 QA/QC

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of 4^{o}C.

Dedicated disposable sampling materials will be used for both soil samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory.

6.3.5 DUSR

The DUSR provides a thorough evaluation of analytical data without third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the

site/project specific criteria for data quality and data use. Verification and/or performance monitoring samples collected under this RAWP will be reviewed and evaluated in accordance with the Guidance for the Development of Data Usability Summary Reports as presented in Appendix 2B of DER-10. The completed DUSR for verification/performance samples collected during implementation of this RAWP will be included in the final Engineering Report.

6.3.6 Reporting of End-Point Data in FER

All endpoint data collected as part of this remedial action will be summarized and presented in the Final Engineering Report. The summary tables will include comparison of results to unrestricted SCOs to verify attainment of Track 1. Laboratory reports and the DUSR will be included as an appendix in the FER.

6.4 ESTIMATED MATERIAL REMOVAL QUANTITIES

The selected remedial action includes the excavation of soil within the petroleum-CVOC and metals hot spot areas to a depth of approximately 15 feet or as needed to achieve unrestricted SCOs. The area of petroleum-CVOC impacted soil is estimated to be less than 1,500 square feet with roughly 5 feet of uncontaminated overburden materials identified as historic fill. This will generate approximately 555 cy (833 tons) of contaminated soil for disposal. Hot spot areas with elevated metals are estimated to be less than 350 sf with a depth of 3 feet below the anticipated construction depth. This will generate approximately 35 cy (52 tons) of soil per hot spot for disposal for a total of 140 cy (204 tons).

Historic fill materials were documented throughout the site varying in thickness from 2 to 12 feet. Fill materials generally extend deeper in the eastern half of the site and shallower in the western part of the site due to the 10 foot elevation change between Wythe Avenue and Kent Avenue and the common slab elevation throughout the building. Fill materials also extend deeper in general on the north parcel (A) then they do on the south parcel (B). Based on the planned excavation depths, it is expected that historic fill totals approximately 18,683 cubic yards on parcel A and 10,952 on parcel B, generating approximately 29,600 cy (41,440 tons) of fill for disposal.

Excavation for the basement level parking and storage areas will continue past the fill in the many areas of the site generating an additional 2,821 cubic yards of clean native soil from parcel A and 12,752 cubic yards from parcel B for a total of 15,573 cubic yards of clean fill.

Approximately 10,000 cy of the uncontaminated native soil will be reused on site as backfill and to raise areas of the Site to construction grade level following the over excavation to remove petroleum-CVOC impacted soil and historic fill. This soil will be tested in to assure compliance with SCOs before being reused on-site.

6.5 SOIL/MATERIALS MANAGEMENT PLAN

6.5.1 Excavation of Petroleum-CVOC Contaminated Soils (Northwest Corner)

Petroleum impacted soil, with elevated levels of both CVOCs and SVOCs, has been documented within a 1,500 sf area in the northwest corner of the property. The vertical extent is limited to 15 feet below existing slab grade. The impacted soil in this area will be removed prior to the excavation for the building foundation. Uncontaminated overburden soil (approximately top 5 feet) will be removed first and stockpiled separately for disposal as historic fill.

Excavated soil will be secured and temporarily stored on-site until arrangements can be made for off-site disposal. As an alternative, pre-characterization samples may be collected to allow the soil to be loaded directly on to trucks for transport to the disposal facility. Soils excavated from PCE hot-spot areas and petroleum contaminated soils which contain elevated levels of PCE, will be classified as hazardous unless the NYSDEC issues a contained-in letter allowing the material to be classified as non-hazardous.

The final determination on classification will be based on the results of waste characterization analysis and the NYSDEC.

Soil excavation will be performed in accordance with the procedures described under Section 5.5 of DER-10 as follows:

- A description and photographic documentation of the excavation.
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.).
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a calibrated photoionization detector (PID).

Final excavation depth, length, and width will be determined by the Remedial Engineer or his designee, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.). Expansion of the excavation beyond the planned hotspot area is anticipated and can easily be accommodated.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the HASP;

- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated;

- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile or dispose of separate from the impacted soil;

- If USTs are discovered, the NYSDEC will be notified and the best course of action to remove the structure should be determined in the field. This may involve the continued removal of overburden to access the top of the structure or continued trenching around the perimeter to minimize its disturbance;
- If physically contaminated soil is present (e.g., staining, odors, sheen, PID response, etc), an attempt will be made to remove it to the extent not limited by the site boundaries. If possible, physically impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separate dedicated plastic sheeting or live loaded into trucks from the disposal facility. Removal of the impacted

soils will continue until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present;

- Excavated soils which are temporarily stockpiled on-site will be covered with 6-mil polyethylene sheeting while disposal options are determined. Sheeting will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property;

- Once the Remedial Engineer is satisfied with the removal effort, verification or confirmatory samples will be collected from the excavation as described in **Section 6.2** of this document.

The excavation of hot-spot areas will be performed by a qualified remedial contractor and fully trained personnel (40HR OSHA HAZWOPER).

6.5.2 Excavation of Metals Hot Spots and Historic Fill Materials

Historic fill has been identified throughout most of the site. The depth varies from 2 feet to approximately 12 ft. The fill material contains several SVOCs and metals including Arsenic, Barium, Cadmium, Chromium, Copper, Manganese, Mercury, Nickel, Lead, Silver and Zinc above unrestricted objectives. Arsenic, Barium, Copper, Manganese, Lead and mercury were also reported above restricted residential objectives in some areas. Historic fill which is present in areas of the site which are scheduled for the excavation of basement levels or which will otherwise be disturbed through grading or other activities, will be segregated from non-contaminated native soils and disposed of off-site at a permitted disposal facility. Excavated historic fill materials will be secured and temporarily stored on-site until arrangements can be made for off-site disposal. As an alternative, pre-characterization samples may be collected to allow the soil to be loaded directly on to trucks for transport to the disposal facility. It is anticipated that historic fill materials will be classified as a non-hazardous material. It is anticipated that the excavation of historic fill materials will be performed by the excavation contractor for the construction project.

6.5.3 Excavation of Native Soils

Native soils are present directly below the fill materials and will require excavation for basement areas and foundation components during construction of the new buildings. Since excavation of the basement areas will begin following removal of petroleum-CVOC impacted soil and historic fill, it is expected that native soils will not be contaminated. However, if evidence of contamination is discovered beneath the existing building's foundation following demolition, or during the excavation of basement areas, the contamination will be removed to the extent possible and segregated from clean native soils for proper disposal. Clean native soils will be stockpiled on-site and characterized for reuse on-site in areas over excavated to remove historic fill. Any excess soil will be disposed of off-site as a beneficial re-use material upon approval by the NYSDEC Region 2's Division of Materials Management. Clean native soils utilized on-site will be subject to a testing program to verify that they meet unrestricted SCOs prior to use.

It is anticipated that the excavation of native soil materials will be performed by the excavation contractor for the construction project.

6.5.4 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). 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.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during 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 Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

6.5.5 Stockpile Methods

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

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Water will be available on-site at suitable supply and pressure for use in dust control.

6.5.6 Materials Excavation and Load Out

The Remedial Engineer or a qualified 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 solely responsible for safe execution of all invasive and other work performed under this Plan.

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

Where effective, the equipment will be “dry” decontaminated using a broom and/or brushes. If significant amounts of soil or other contaminants remain after the dry decontamination, the equipment will also be pressure washed before leaving the Site. The QEP will be responsible for ensuring that all outbound trucks are dry-brushed or washed on the truck wash/equipment pad 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 QEP

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 State, 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 and bridge footings).

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

Each hotspot and structure to be remediated will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

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 Site Characterization, Remedial Investigation, and Remedial Action will be located and shown on maps to be reported in the Final Engineering Report.

6.5.7 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.

Truck transport routes are as follows: ENTERING SITE - from the Brooklyn Queens Expressway head northwest on Kent Avenue (one-way) approximately ¾ miles to the Site entrance on the right. EXITING SITE – turn right onto Wythe Avenue (one-way) heading southeast ¾ miles to the Brooklyn Queens Expressway overpass. Go under the overpass and turn left heading north on Penn Street (one-way). Bear left onto the Brooklyn-Queens Expressway on-ramp. These routes are shown in **Figure 16**.

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

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development. Material transported by trucks exiting the Site will be secured with tight-fitting covers. If loads contain wet material capable of producing free liquid, truck liners will be used. All trucks will be inspected, dry-brushed and / or, as needed, before leaving the site.

6.5.8 Materials Disposal Off-Site

Multiple disposal facility designations will be employed for the materials removed from the Site. Once final arrangements have been made the disposal location(s) will be reported to the NYSDEC Project Manager.

The total quantity of material expected to be disposed off-Site is 35,868 cubic yards including 555 cubic yards of petroleum-CVOC impacted soil, 140 cubic yards of hotspot metals soil, 29,600 cubic yards of historic fill and 5,575 cubic yards of clean native soil.

All petroleum contaminated and historic fill material 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 this Site is prohibited without formal NYSDEC approval. It is anticipated that petroleum contaminated soils and historic fill will be disposed of as a non-hazardous material. Final classification of excavated materials will be dependant upon the results of waste characterization sampling. Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. 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.

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 2 DSHM. 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.

Clean native soil removed from the site for development purposes (i.e. basement levels) will be handled as unregulated or beneficial use disposal. This soil will undergo a testing program to confirm that it meets Track 1 unrestricted SCOs prior to unregulated disposal or reuse on-site. Confirmation testing of clean soils will be in Accordance with NYSDEC CP-51 Guidance as follows:

Contaminant	**VOCs**	**SVOCs, Inorganics & PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	Each composite sample for analysis is created from 3-5 discrete samples from representative locations in the fill.
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Uncontaminated native soil confirmed by the above testing program and removed from the site, will be disposed of as unregulated C&D material or sent to a beneficial re-use facility. The final destination of soils whether classified as contaminated or uncontaminated must be approved by the NYSDEC.

Concrete demolition material generated on the Site from building slabs, parking areas and other structures will be segregated, sized and shipped to a concrete recycling facility upon approval by the NYSDEC's Division of Materials Management for Region 2.. Concrete crushing or processing on-Site is prohibited. Asphalt removed from the parking areas will be sent to a separate recycling facility.

Additionally, it is common to encounter scrap metals and large boulders (greater than one foot in diameter) during excavation which may not be accepted by either the licensed disposal facility or the C&D facility. These materials will be segregated and subsequently recycled at local facilities. Uncontaminated metal objects will be taken to a local scrap metal facility.

Bricks and other C&D material are also not accepted by most soil disposal facilities if present at greater then 5% by volume. This material, if encountered, will be sent to a C&D landfill or other C&D processing facility if approved by the DEC. C&D material of this type is most often encountered on sites in which former basement structures have been filled in with material from demolishing a former building. There was no evidence of former basement areas identified during previous investigations performed at the Site.

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 BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that 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 (including Site Characterization data); 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.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report. Documentation for materials disposed of at recycling facilities (such as metal, concrete, asphalt) and as non-regulated C&D will include transport tickets for each load stating the origin of the material, the destination of the material and the quantity transported.

The Final Engineering Report 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, and 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.

6.5.9 Materials Reuse On-Site

Approximately 10,000 cy of the uncontaminated native soil excavated from the basement and parking areas of the new buildings will be reused on site to raise areas to construction grade level following the over excavation to remove petroleum impacted soil and historic fill. Re-use of on-Site clean native soil will only be allowed if the material is found to meet unrestricted criteria through the verification testing program detailed in Section 5.4.5 above. 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.

Chemical criteria for on-Site reuse of material has been approved by NYSDEC. This criteria is the Track 1 Unrestricted SCOs as presented in **Table 1**. 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.

Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos. Concrete crushing or processing on-Site is prohibited. 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.

6.5.10 Fluids Management

As the depth to groundwater at the site is approximately 10 feet below the planned excavation depth, dewatering operations will not be employed during construction. However, if dewatering from the accumulation of precipitation or surface runoff becomes necessary, dewatering fluids will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site. Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

6.5.11 Backfill from Off-Site Sources

Off-site fill material may be needed to stabilize the entrance - exit areas of the Site, for temporary driveways for loading trucks and as an underlayment to structural components of the new buildings including slabs and footings. Recycled Concrete Aggregate (RCA) derived from recognizable and uncontaminated concrete and supplied by facilities permitted by, and in full compliance with Part 360-16 and DSNY regulations, is an acceptable form of backfill material. The Remedial Engineer is responsible for ensuring that the facility is compliant with the registration and permitting requirements of 6 NYCRR Part 360 and DSNY regulations at the time the RCA is acquired. RCA imported from compliant facilities does not require additional testing unless required by NYS DEC and DSNY under its terms of operations for the facility. Documentation of part 360-16 and DSNY compliance must be provided to the Remedial Engineer before the RCA is transported to the Site.

Fill material may also consist of virgin mined sand, gravel or stone products. Materials from a virgin mined source may be imported to the Site without testing provided that that the material meets the specifications of the geotechnical engineer, Remedial Engineer, and Redevelopment Construction Documents and that the source of the material is approved by the Remediation Engineer and the NYSDEC Project Manager.

The source approval process will require a review of the following information:

- The origin of the material;
- The address of the facility which mines/processes the material;
- A letter from the facility stating that the material to be delivered to the site is a virgin mined material and that it has not been co-mingled with other materials during processing or stockpiling.

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

The Final Engineering Report 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".

Under no circumstances will fill materials be imported to the site without prior approval from the NYSDEC Project Manager. If sufficient documentation is not obtained, fill materials will be tested at a frequency consistent with that as specified in Table 4 of NYSDEC CP-51 Soil Cleanup Guidance Policy. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

6.5.12 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Erosion and sediment control measures identified in the 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 Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

6.5.13 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These

analyses will not be limited to 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.

6.5.14 Community Air Monitoring Plan

The Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at construction sites.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air. The primary concerns for this site are odors associated with groundwater purging and sampling.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report. The complete CAMP developed for this site is included in **Attachment F** or this Work Plan.

6.5.15 Odor, Dust and Nuisance Control Plan

The Final Engineering Report 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."

6.5.15.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site. 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 Applicant's Remediation Engineer, who is responsible for certifying the Final Engineering Report.

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.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

6.5.15.2 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 though spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water application.

6.5.15.3 Nuisance Control Plan

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work. A plan has been developed and utilized by the contractor for all remedial work and conforms, to NYCDEP noise control standards.

7.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residually contaminated groundwater and soil vapor are expected to exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. The IC is described hereafter. Long-term management of ICs and of residual contamination will be executed under a Site specific Site Management Plan (SMP) that will be developed and included in the FER if needed.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have the following EC systems:

1. A sub-slab depressurization system and vapor barrier beneath the occupied areas of the new building.

Operation of the SSDS must be terminated within 5 years to achieve the Track 1 remedy as proposed for both parcels.

The FER will report residual contamination on the Site in tabular and map form. This will include presentation of exceedances of Track 1 objectives.

8.0 ENGINEERING CONTROLS

8.1 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

An SSDS and vapor barrier were designed for the portion of the basement slab in each of the 16 buildings which is to be used for mechanical and utility rooms and tenant's storage rooms.

An SSDS will not be required beneath the remainder of the basement level in each building since these areas will be used as a parking garage which must be ventilated to remove vehicle fumes in accordance with the NYC Mechanical Code.

The SSDS beneath the mechanical / utility portion of each basement slab will consist of a single venting zone (1 zone per building). Each zone will provide coverage of approximately 3,125 sf of slab area. This is consistent with USEPA sub-slab depressurization design specifications which recommend a separate vent loop for every 4,000 sf of slab area.

The horizontal vent line is constructed of a continuous loop of perforated 4-inch HDPE pipe. In each zone the horizontal pipe will extend to an adjacent utility chase-way where it will be piped individually to the roof via a 6-inch schedule 40 pvc line. Fill material around the horizontal vent piping is virgin-mined, ½ inch to ¾ inch gravel.

A high density polyethylene vapor barrier liner (HPDE) will be installed over the SSDS prior to pouring the building's concrete slab. The vapor barrier will consist of a 20 mil HDPE geomembrane liner manufactured by GSE Lining Technologies of North America, or equivalent. The vapor barrier will extend throughout the portion of the slab to be used for mechanical / utility rooms in each of the 16 new buildings to be constructed at the site. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner. The specifications state that all vapor barrier seams, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer's recommendations and instructions.

An EBC field inspector under the direct supervision of a professional engineer will inspect and photograph the vapor barrier at several critical stages before during and after the installation is complete, to assure compliance with design specifications. Detailed specifications of the SSD system are provided **Attachment K**.

8.1.1 Criteria for Termination

The active SSDS in each building will not be discontinued without written approval by the NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the property owner based on confirmatory data that justifies such a request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

9.0 INSTITUTIONAL CONTROLS

The intent of this project is to achieve Track 1 Cleanup criteria on one or both parcels which comprise the Site, however, since residually contaminated groundwater and soil vapor may remain on the Site following the remedial action, an Engineering Control in the form of an SSDS will be required, at least initially, for this remedy. Operation of the SSDS must be terminated within 5 years to achieve the Track 1 Cleanup. Since an Engineering Control in the form of an SSDS is required for this remedy, institutional controls are also required.

The IC consists of an Environmental Easement and a Site Management Plan. These elements are described in this Section. A Site -specific Environmental Easement will be recorded with the City of New York to provide an enforceable means of ensuring the continual and proper management of residual 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 Institutional Controls (ICs) placed on this 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 Site Management Plan (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 grantor's successors and assigns.

9.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions than an Environmental Easement is required. If an Environmental Easement is needed following completion of the remedy an Environmental Easement approved by NYSDEC will be filed and recorded with the City of New York. The Environmental Easement (if needed) will be submitted as part of the Final Remediation Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the City of New York before the Certificate of Completion can be issued by NYSDEC. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan (SMP), which provides all of the methods and procedures to be followed to comply with this remedy.

If residual contamination in groundwater and soil vapor remains following the remedy, the Controlled Property (Site) will have two Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- A soil vapor mitigation system consisting of a sub slab depressurization system under the occupied area of the building must be inspected, certified, operated and maintained as required by the SMP;
- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in the SMP;
- 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 statement must be certified by an expert that the NYSDEC finds acceptable.

9.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan 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 Site Management Plan 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 Engineering and Institutional Controls; (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 Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of 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 Engineering and Institutional Control Plan for implementation and management of EC/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; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated [month, year], 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 Site Management Plan

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.

The Site Management Plan in the Final Engineering Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all volatile organic carbon remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

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

10.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) and Certificate Of Completion (COC) 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 plan. 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 Final Engineering Report will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

The Final Engineering Report 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 residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that

shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The Final Engineering Report 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 Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

10.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer [name] 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 _____certify that I am currently a NYS registered professional engineer and that this Final Engineering 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 work plan and any DER-approved modifications.

NYS Professional Engineer # _____ Date _____ Signature

11.0 SCHEDULE

Due to the size of the Site, remedial activity will be performed in 2 stages to coordinate with site redevelopment. Stage 1 will include the demolition of the entire building on the northern half of the property from existing private road, S. 9th Street, to the planned private road, S. 10th Street. Hot spot areas will then be removed and the property excavated to final construction grade. Installation of the building foundation will be performed in conjunction with construction excavation.

Stage 1 building demolition is currently underway and is expected to be completed in six weeks. The remedial action will begin with mobilization of equipment and material to the Site which will begin approximately 2 weeks following RAWP approval and within 10 days of the distribution of the Construction Fact Sheet. Mobilization will be followed by removal of the petroleum – CVOC hot spot area and confirmation sampling. This work is expected to take 2 weeks. Excavation and disposal of historic fill materials will be begin following the hotspot removal and is expected to continue for 12 to 18 weeks as part of the construction excavation and foundation installation. Stage 2 would follow a similar timeline with building demolition beginning in early 2014. The schedule of tasks completed under this RAWP is as follows:

Conduct pre-construction meeting with NYSDEC	Within 2 weeks of RAWP approval
Mobilize equipment to the site and construct truck pad and other designated areas	Within 2 weeks following Stage 1 Building demolition
Mobilize Remediation Contractor and equipment to the Site	Within 1 week following Site prep and truck pad construction
Begin removal of northwest hot spot and excavate petroleum-CVOC impacted soils	Immediately following mobilization
Complete removal of impacted soils northwest hotspot area, collect endpoint samples and backfill excavation. Demobilize Remediation Contractor	Within 2 weeks of mobilization
Mobilize excavation contractor Begin excavation of historic fill	Within 2 weeks of completing hotspot remediation
Complete excavation and disposal of historic fill soils and begin excavation of native soils for basement level and install foundation.	4 months weeks following mobilization
Perform endpoint verification of entire site	Performed in sequence as final depth of each excavated area is complete.
Begin Stage 2 Building Demolition	1st quarter of 2014

TABLES

TABLE 1
Soil Cleanup Objectives

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
PESTICIDES / PCBs							
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
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
SEMI-VOLATILES							
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
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]

TABLE 1
Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
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
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). Footnotes

a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

TABLE 2
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Number of Samples	Rationale for Sampling	Laboratory Analysis
Shallow Subsurface soil (0 to 2 and/or 2-4 feet bgs)	4 borings in Zone A, 7 borings in Zone B, 6 borings in Zone C and 4 borings in Zone D.	21	Evaluate quality of fill and identify source areas.	VOCs EPA Method 8260B and SVOCs EPA Method 8270
Shallow Subsurface soil (0 to 2 and/or 2-4 feet bgs)	4 borings in Zone A, 10 borings in Zone B, 6 borings in Zone C and 4 borings in Zone D.	24	Evaluate quality of fill and identify source areas.	TAL Metals
Shallow Subsurface soil (0 to 2 and/or 2-4 feet bgs)	7 borings in Zone A, 8 borings in Zone B, 6 borings in Zone C and 4 borings in Zone D.	25	Evaluate quality of fill and identify source areas.	Pesticides and PCBs
Deep Subsurface soil (8 ft or greater)	8 borings in Zone A, 8 borings in Zone B, 5 borings in Zone C and 4 borings in Zone D.	29	Evaluate quality of native soil and delineate vertical extent of petroleum and chlorinated solvents at and below water table.	VOCs EPA Method 8260B and SVOCs EPA Method 8270
Deep Subsurface soil (8 ft or greater)	6 borings in Zone A, 6 borings in Zone B, 9 borings in Zone C and 4 borings in Zone D.	34	Evaluate quality of native soil and delineate vertical extent of metals above unrestricted SCOs.	TAL Metals
Deep Subsurface soil (8 ft or greater)	4 borings in Zone A, 5 borings in Zone B, 5 borings in Zone C and 4 borings in Zone D.	18	Evaluate quality of native soil.	Pesticides and PCBs
Total (Soils)		**151**	**All Parameters**	
Shallow Groundwater (water table)	From 33 shallow monitoring wells installed across the Site.	33	To determine general groundwater quality and delineate VOC and petroleum affected groundwater.	VOCs EPA Method 8260B, SVOCs EPA Method 8270, pesticides / PCBs, TAL metals (dissolved & total)
Deep Groundwater (13-18 ft below water table)	From 4 monitoring wells installed at shallow well locations MW3, MW4, MW6 and MW7.	4	To supplement previous sampling and delineate VOC and petroleum affected groundwater.	VOCs EPA Method 8260B
Total (Groundwater)		**37**	**All Parameters**	
Soil Gas (12 ft below existing slab)	12 interior and 13 perimiter soil gas implants insalled at the Site.	25	Evaluate soil gas in iterior portions and perimeter of Site.	VOCs EPA Method TO15
Indoor Air / Outdoor Air	4 interior locations within operating warehouse. 1 exterior control sample in loading dock area.	5	Evaluate indoor air quality in ocupied portion of site. .	VOCs EPA Method TO15
Total (Air)		**30**		
MS/MSD	Matrix spike and Matrix spike duplicates at the rate 5%	5	To meet requirements of QA / QC program	VOCs EPA Method 8260B, SVOCs EPA Method 8270 BN and / or chromium, hexavalent chromium, manganese, silver and nickel
Trip Blanks	One laboratory prepared trip blank to accompany samples each time they are delivered to the laboratory.	5	To meet requirements of QA / QC program	VOCs EPA Method 8260B
Total (QA / QC Samples)		10		

TABLE 3
431 Kent Avenue, Brooklyn, New York
ZONE A
Soil Analytical Results
Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYSDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone A B1(0-2') µg/Kg	Zone A B1(13-15') µg/Kg	Zone A B2(0-2') µg/Kg	Zone A B2(13-15') µg/Kg	Zone A B3(0-2') µg/Kg	Zone A B3(10-12') µg/Kg	Zone A B3(13-15') µg/Kg	Zone A B4(2-4') PCB3 µg/Kg	Zone A B4(13-15') PCB3 µg/Kg
1,1,1,2-Tetrachlorothane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	270	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	20	3,100	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2,400	4,900	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1,800	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone			ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	60	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	760	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	370	49,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromoethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1,000	41,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	260		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	930	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	100,000	ND	ND	ND	ND	ND	**2,500**	ND	ND	ND
n-Butylbenzene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	260	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene			ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	19,000	ND	ND	ND	ND	**14**	**2,000**	ND	ND	ND
Tetrahydrofuran (THF)			ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	700	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes			ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
trabs-1,4-dichloro-2-butene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	470	21,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	20	900	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total BTEX Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total VOCs Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**14.0**	**4,500.0**	**0.0**	**0.0**	**0.0**

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 4
431 Kent Avenue, Brooklyn, New York
ZONE A - SUPPLEMENTAL
Soil Analytical Results
Volatile Organic Compounds
JUNE 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	ZA-B7		ZA-B8		ZA-B9		ZA-B10	
			(19-22) µg/Kg	(28-30) µg/Kg	(17-20) µg/Kg	(23-25) µg/Kg	(19-21) µg/Kg	(23-25) µg/Kg	(21-23) µg/Kg	(24-25) µg/Kg
1,1,1,2-Tetrachlorothane			ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	270	26,000	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane			ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	52,000	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane			ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	20	3,100	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	52,000	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2,400	4,900	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1,800	13,000	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)			ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone			ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND
Benzene	60	4,800	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene			ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane			ND	ND	ND	ND	ND	ND	ND	ND
Bromoform			ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane			ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	760	2,400	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane			ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	370	49,000	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane			ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250	100,000	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane		100,000	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1,000	41,000	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	260		ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	930	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	50	100,000	**3.1** JS	**3.0** JS	**3.8** JS	**2.9** JS	**3.2** JS	**2.8** JS	**2.1** JS	**2.8** JS
Naphthalene	12,000		ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	260	100,000	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Styrene			ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	19,000	ND	ND	ND	**1.7** J	ND	ND	ND	ND
Tetrahydrofuran (THF)			ND	ND	ND	ND	ND	ND	ND	ND
Toluene	700	100,000	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190	100,000	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND
trabs-1,4-dichloro-2-butene			ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	470	21,000	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane			ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	20	900	ND	ND	ND	ND	ND	ND	ND	ND
Total BTEX Concentration			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total VOCs Concentration			**3.1**	**3.0**	**3.8**	**4.6**	**3.2**	**2.8**	**2.1**	**2.8**

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives
ND - Not-detected
J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.
S - This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.
N - The concentration is based on the response fo the nearest internal. This flag is used on the TIC form for all compounds identified.
Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value
Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 5
431 Kent Avenue, Brooklyn, New York
ZONE B
Soil Analytical Results
Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone B B1(0-2') µg/Kg	Zone B B1(13-15') µg/Kg	Zone B B2(0-2') T2 µg/Kg	Zone B B2(13-15') T2 µg/Kg	Zone B B3(0-2') A1 µg/Kg	Zone B B3(13-15') A1 µg/Kg	Zone B B4(0-2') Ben µg/Kg	Zone B B4(13-15') Ben µg/Kg	Zone B B5(0-2') P2 µg/Kg	Zone B B6(0-2') P1 µg/Kg	Zone B B6(0-2') P1 µg/Kg	Zone B B7(13-15') µg/Kg	Field Duplicate µg/Kg	Zone B Tank 1 (20-22') µg/Kg	Zone B Tank 3 (20-22') µg/Kg	Zone B B3(8') µg/Kg
1,1,1,2-Tetrachlorothane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1,2-Trichloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1-Dichloroethane	270	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,1-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2,3-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2,3-Trichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2,4-Trimethylbenzene	3,600	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2-Dichloroethane	20	3,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,3,5-Trimethylbenzene	8,400	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2,400	4,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,3-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
1,4-Dichlorobenzene	1,800	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
2,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
2-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
2-Hexanone (Methyl Butyl Ketone)			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
2-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
4-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
4-Methyl-2-Pentanone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Acetone	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Benzene	60	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Bromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Bromodichloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Bromoform			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Bromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Carbon tetrachloride	760	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Chlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Chloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Chloroform	370	49,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Chloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
cis-1,2-Dichloroethene	250	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
cis-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Dibromoethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Dichlorodifluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Ethylbenzene	1,000	41,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	260		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Methyl t-butyl ether (MTBE)	930	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Naphthalene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	260	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Styrene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	19,000	ND	ND	ND	ND	ND	ND	ND	ND	**5.6**	ND	ND	ND	ND	-	-	ND
Tetrahydrofuran (THF)			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Toluene	700	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
trans-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
trabs-1,4-dichloro-2-butene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Trichloroethene	470	21,000	**97**	ND	**160**	ND	**55**	ND	ND	ND	ND	ND	**9.2**	ND	ND	-	-	ND
Trichlorofluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Vinyl Chloride	20	900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	ND
Total BTEX Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total VOCs Concentration			**97.0**	**0.0**	**160.0**	**0.0**	**55.0**	**0.0**	**0.0**	**0.0**	**5.6**	**0.0**	**9.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

"-" - Not Analyzed

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 6
431 Kent Avenue, Brooklyn, New York
ZONE C
Soil Analytical Results
Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone C B1(0-2') µg/Kg	Zone C B1(13-15') µg/Kg	Zone C B2(0-2') µg/Kg	Zone C B2(13-15') µg/Kg	Zone C B3(0-2') µg/Kg	Zone C B3(13-15') µg/Kg	Zone C B4(0-2') µg/Kg	Zone C B5(0-2') µg/Kg	Zone C B5(13-15') µg/Kg	Zone C B6(0-2') µg/Kg	Zone C B6(13-15') µg/Kg
1,1,1,2-Tetrachlorothane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	270	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	20	3,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2,400	4,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1,800	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	60	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	760	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	370	49,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromoethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1,000	41,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	260		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	930	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene			ND	ND	**9.7**	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	260	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	19,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	**130**	ND
Tetrahydrofuran (THF)			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	700	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trabs-1,4-dichloro-2-butene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	470	21,000	**160**	ND	**77**	ND	**63**	ND	**110**	ND	ND	ND	ND
Trichlorofluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	20	900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total BTEX Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total VOCs Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**130.0**	**0.0**

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 7
431 Kent Avenue, Brooklyn, New York
ZONE D
Soil Analytical Results
Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone D B1(0-2') µg/Kg	Zone D B1(13-15') µg/Kg	Zone D B2(0-2') µg/Kg	Zone D B2(13-15') µg/Kg	Zone D B3(0-2') µg/Kg	Zone D B3(13-15') µg/Kg	Zone D B3(10-12') µg/Kg	Zone D B4(0-2) µg/Kg	Zone D B4(13-15') µg/Kg
1,1,1,2-Tetrachlorothane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	680	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	270	26,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	20	3,100	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	52,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2,400	4,900	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1,800	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone			ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	60	4,800	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide			ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	760	2,400	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1,100	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	370	49,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromoethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1,000	41,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	260		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	930	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	50	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene			**9.9**	ND	**25**	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	260	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene			ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5,900	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	19,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran (THF)			ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	700	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes			ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	190	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			ND	ND	ND	ND	ND	ND	ND	ND	ND
trabs-1,4-dichloro-2-butene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	470	21,000	ND	ND	**170**	ND	ND	**32**	ND	**6.3**	ND
Trichlorofluoromethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	20	900	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total BTEX Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total VOCs Concentration			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**32.0**	**0.0**	**0.0**	**0.0**

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives
ND - Not-detected
Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value
Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 8
431 Kent Avenue, Brooklyn, New York
ZONE A
Soil Analytical Results
Semi-Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone A B1(0-2') µg/Kg	Zone A B1(13-15') µg/Kg	Zone A B2(0-2') µg/Kg	Zone A B2(13-15') µg/Kg	Zone A B3(0-2') µg/Kg	Zone A B3(10-12') µg/Kg	Zone A B3(13-15') µg/Kg	Zone A B4(2-4') PCB3 µg/Kg	Zone A B4(13 15') PCB3 µg/Kg
1,2,4,5-Tetrachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol (o-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine			ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	100,000	ND	ND	ND	ND	600	64,000	ND	ND	ND
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone			ND	ND	ND	ND	ND	180,000	ND	ND	ND
Aniline			ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100,000	100,000	ND	ND	390	ND	1,800	280,000	ND	370	ND
Azobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1,000	1,000	610	ND	1,500	ND	9,400	280,000	ND	1,500	ND
Benzidine			ND	ND		ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	1,000	560	ND	1,300	ND	9,300	240,000	ND	1,400	ND
Benzo(b)fluoranthene	1,000	1,000	810	ND	2,000	ND	12,000	300,000	ND	2,000	ND
Benzo(g,h,i)perylene	100,000	100,000	430	ND	660	ND	3,200	110,000	ND	600	ND
Benzo(k)fluoranthene	800	3,900	ND	ND	850	ND	3,400	100,000	ND	600	ND
Benzoic Acid			ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole			ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1,000	3,900	690	ND	1,300	ND	8,600	230,000	ND	1,700	ND
Dibenzo(a,h)anthracene	330	330	ND	ND	ND	ND	760	29,000	ND	ND	ND
Dibenzofuran			ND	ND	ND	ND	270	54,000	ND	ND	ND
Diethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	100,000	1,300	ND	2,600	ND	18,000	660,000	ND	3,400	ND
Fluorene	30,000	100,000	ND	ND	ND	ND	450	67,000	ND	ND	ND
Hexachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	500	350	ND	550	ND	3,100	100,000	ND	560	ND
Isophorone			ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	100,000	ND	ND	ND	ND	290	35,000	ND	ND	ND
Nitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	800	6,700	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	100,000	880	ND	2,100	ND	10,000	700,000	ND	2,500	ND
Phenol	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100,000	100,000	1,200	ND	2,400	ND	17,000	530,000	ND	3,200	ND
Pyridine			ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 9
431 Kent Avenue, Brooklyn, New York
ZONE A - SUPPLEMENTAL
Soil Analytical Results
Semi-Volatile Organic Compounds
JUNE 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	ZA-B7		ZA-B8		ZA-B9		ZA-B10	
			(19-22) µg/Kg	(28-30) µg/Kg	(17-20) µg/Kg	(23-25) µg/Kg	(19-21) µg/Kg	(23-25) µg/Kg	(21-23) µg/Kg	(24-25) µg/Kg
1,2,4,5-Tetrachlorobenzene			-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene			-	-	-	-	-	-	-	-
1,2-Dichlorobenzene			-	-	-	-	-	-	-	-
1,3-Dichlorobenzene			-	-	-	-	-	-	-	-
1,4-Dichlorobenzene			-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol			-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol			-	-	-	-	-	-	-	-
2,4-Dichlorophenol			-	-	-	-	-	-	-	-
2,4-Dimethylphenol			-	-	-	-	-	-	-	-
2,4-Dinitrophenol			-	-	-	-	-	-	-	-
2,4-Dinitrotoluene			-	-	-	-	-	-	-	-
2,6-Dinitrotoluene			-	-	-	-	-	-	-	-
2-Chloronaphthalene			-	-	-	-	-	-	-	-
2-Chlorophenol			-	-	-	-	-	-	-	-
2-Methylnaphthalene			-	-	-	-	-	-	-	-
2-Methylphenol (o-cresol)	330	100,000	-	-	-	-	-	-	-	-
2-Nitroaniline			-	-	-	-	-	-	-	-
2-Nitrophenol			-	-	-	-	-	-	-	-
3&4-Methylphenol (m&p-cresol)	330	100,000	-	-	-	-	-	-	-	-
3,3'-Dichlorobenzidine			-	-	-	-	-	-	-	-
3-Nitroaniline			-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol			-	-	-	-	-	-	-	-
4-Bromophenyl phenyl ether			-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol			-	-	-	-	-	-	-	-
4-Chloroaniline			-	-	-	-	-	-	-	-
4-Chlorophenyl phenyl ether			-	-	-	-	-	-	-	-
4-Nitroaniline			-	-	-	-	-	-	-	-
4-Nitrophenol			-	-	-	-	-	-	-	-
Acenaphthene	20,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine			-	-	-	-	-	-	-	-
Benzo(a)pyrene	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	800	3,900	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic Acid			-	-	-	-	-	-	-	-
Butyl benzyl phthalate			-	-	-	-	-	-	-	-
Bis(2-chloroethoxy)methane			-	-	-	-	-	-	-	-
Bis(2-chloroethyl)ether			-	-	-	-	-	-	-	-
Bis(2-chloroisopropyl)ether			-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate			-	-	-	-	-	-	-	-
Carbazole			-	-	-	-	-	-	-	-
Chrysene	1,000	3,900	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	330	330	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran			-	-	-	-	-	-	-	-
Diethyl phthalate			-	-	-	-	-	-	-	-
Dimethyl phthalate			-	-	-	-	-	-	-	-
Di-n-butylphthalate			-	-	-	-	-	-	-	-
Di-n-octylphthalate			-	-	-	-	-	-	-	-
Fluoranthene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	30,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene			-	-	-	-	-	-	-	-
Hexachlorobutadiene			-	-	-	-	-	-	-	-
Hexachlorocyclopentadiene			-	-	-	-	-	-	-	-
Hexachloroethane			-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	500	500	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone			-	-	-	-	-	-	-	-
Naphthalene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene			-	-	-	-	-	-	-	-
N-Nitrosodimethylamine			-	-	-	-	-	-	-	-
N-Nitrosodi-n-propylamine			-	-	-	-	-	-	-	-
N-Nitrosodiphenylamine			-	-	-	-	-	-	-	-
Pentachloronitrobenzene			-	-	-	-	-	-	-	-
Pentachlorophenol	800	6,700	-	-	-	-	-	-	-	-
Phenanthrene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Pyridine			-	-	-	-	-	-	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.

S - This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

N - The concentration is based on the response fo the nearest internal. This flag is used on the TIC form for all compounds identified.

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 10
431 Kent Avenue, Brooklyn, New York
ZONE B
Soil Analytical Results
Semi-Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone B B1(0-2') µg/Kg	Zone B B1(13-15') µg/Kg	Zone B B2(0-2') T2 µg/Kg	Zone B B2(13-15') T2 µg/Kg	Zone B B3(0-2') A1 µg/Kg	Zone B B3(13-15') A1 µg/Kg	Zone B B4(0-2') Ben µg/Kg	Zone B B4(13-15') Ben µg/Kg	Zone B B5(0-2') P2 µg/Kg	Zone B B6(0-2') P1 µg/Kg	Zone B B7(0-2') µg/Kg	Zone B B7(13-15') µg/Kg	Field Duplicate µg/Kg	Zone B Tank 1 (20-22') µg/Kg	Zone B Tank 3 (20-22') µg/Kg
1,2,4,5-Tetrachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
1,2-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
1,3-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
1,4-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4,5-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4,6-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4-Dichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4-Dimethylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4-Dinitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,4-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2,6-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Chloronaphthalene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Chlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Methylnaphthalene			ND	ND	ND	ND	ND	ND	660	ND	ND	ND	ND	ND	ND	-	-
2-Methylphenol (o-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
3,3'-Dichlorobenzidine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
3-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4,6-Dinitro-2-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Bromophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Chloro-3-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Chloroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Chlorophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
4-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Acenaphthene	20,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	370	ND	ND	ND	ND
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Aniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Anthracene	100,000	100,000	310	ND	ND	ND	ND	ND	540	ND	ND	ND	840	ND	ND	ND	ND
Azobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(a)anthracene	1,000	1,000	860	ND	560	ND	ND	ND	1,900	ND	640	1,200	3,600	ND	ND	ND	ND
Benzidine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(a)pyrene	1,000	1,000	740	ND	440	ND	ND	ND	2,000	ND	620	1,200	3,500	ND	ND	ND	ND
Benzo(b)fluoranthene	1,000	1,000	1,000	ND	640	ND	ND	ND	2,800	ND	950	1,700	5,200	ND	ND	ND	ND
Benzo(g,h,i)perylene	100,000	100,000	370	ND	300	ND	ND	ND	1,300	ND	290	700	1,200	ND	ND	ND	ND
Benzo(k)fluoranthene	800	3,900	360	ND	ND	ND	ND	ND	1,100	ND	370	690	1,500	ND	ND	ND	ND
Benzoic Acid			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Butyl benzyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Bis(2-chloroethoxy)methane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Bis(2-chloroethyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Bis(2-chloroisopropyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Bis(2-ethylhexyl)phthalate			ND	ND	ND	ND	ND	ND	ND	ND	310	ND	ND	ND	ND	-	-
Carbazole			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Chrysene	1,000	3,900	870	ND	640	ND	ND	ND	2,000	ND	580	1000	3,500	ND	ND	ND	ND
Dibenzo(a,h)anthracene	330	330	ND	ND	ND	ND	ND	ND	350	ND	ND	ND	370	ND	ND	ND	ND
Dibenzofuran			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Diethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Dimethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Di-n-butylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Di-n-octylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Fluoranthene	100,000	100,000	1900	ND	1000	ND	ND	ND	4000	ND	1,000	1900	7,600	ND	ND	ND	ND
Fluorene	30,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	290	ND	ND	ND	ND
Hexachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Hexachlorocyclopentadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Hexachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Indeno(1,2,3-cd)pyrene	500	500	330	ND	ND	ND	ND	ND	1200	ND	ND	550	1,200	ND	ND	ND	ND
Isophorone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Naphthalene	12,000	100,000	ND	ND	ND	ND	ND	ND	570	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
N-Nitrosodimethylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
N-Nitrosodi-n-propylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
N-Nitrosodiphenylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Pentachloronitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Pentachlorophenol	800	6,700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Phenanthrene	100,000	100,000	1600	ND	610	ND	ND	ND	2800	ND	690	890	4,800	ND	ND	ND	ND
Phenol	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Pyrene	100,000	100,000	1600	ND	940	ND	ND	ND	3700	ND	1000	1900	6,500	ND	ND	ND	ND
Pyridine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

"-" - Not Analyzed

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 11
431 Kent Avenue, Brooklyn, New York
ZONE C
Soil Analytical Results
Semi-Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone C B1(0-2') µg/Kg	Zone C B1(13-15') µg/Kg	Zone C B2(0-2') µg/Kg	Zone C B2(13-15') µg/Kg	Zone C B3(0-2') µg/Kg	Zone C B3(13-15') µg/Kg	Zone C B4(0-2') µg/Kg	Zone C B5(0-2') µg/Kg	Zone C B5(13-15') µg/Kg	Zone C B6(0-2') µg/Kg	Zone C B6(13-15') µg/Kg
1,2,4,5-Tetrachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene			ND	ND	ND	ND	**750**	ND	ND	**320**	ND	**300**	ND
2-Methylphenol (o-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	100,000	ND	ND	**500**	ND	**2,100**	ND	ND	**780**	ND	**990**	ND
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	440	ND	ND	**650**	ND	ND	ND
Acetophenone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100,000	100,000	ND	ND	**1,100**	ND	**4,900**	ND	**300**	**2,700**	ND	**2,100**	ND
Azobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1,000	1,000	**480**	ND	**2,500**	ND	**12,000**	ND	**530**	**10,000**	ND	**4,600**	ND
Benzidine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	1,000	**390**	ND	**2,300**	ND	**10,000**	ND	**520**	**9,800**	ND	**4,100**	ND
Benzo(b)fluoranthene	1,000	1,000	**580**	ND	**3,300**	ND	**14,000**	ND	**560**	**12,000**	ND	**5,100**	ND
Benzo(g,h,i)perylene	100,000	100,000	ND	ND	**560**	ND	**5,600**	ND	**370**	**4,600**	ND	**1,300**	ND
Benzo(k)fluoranthene	800	3,900	ND	ND	**1,300**	ND	**4,400**	ND	ND	**3,600**	ND	**1,600**	ND
Benzoic Acid			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	**880**	ND
Bis(2-chloroethoxy)methane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000	ND
Carbazole			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1,000	3,900	**450**	ND	**2,200**	ND	**11,000**	ND	**500**	**9,200**	ND	**4,700**	ND
Dibenzo(a,h)anthracene	330	330	ND	ND	ND	ND	**1,600**	ND	ND	**1,300**	ND	**720**	ND
Dibenzofuran			ND	ND	**400**	ND	**1,600**	ND	ND	**480**	ND	**620**	ND
Diethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	100,000	**770**	ND	**5,000**	ND	**32,000**	ND	**920**	ND	ND	**7,100**	ND
Fluorene	30,000	100,000	ND	ND	**610**	ND	**2,400**	ND	ND	**770**	ND	**810**	ND
Hexachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	500	ND	ND	**540**	ND	**5,600**	ND	**340**	**4,200**	ND	**2,200**	ND
Isophorone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	100,000	ND	ND	**370**	ND	**1,500**	ND	ND	**470**	ND	**620**	ND
Nitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	800	6,700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	100,000	**680**	ND	**5,400**	ND	**26,000**	ND	**1,300**	**1,300**	ND	**9,600**	ND
Phenol	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100,000	100,000	**700**	ND	**4,000**	ND	**26,000**	ND	**770**	**24,000**	ND	**5,900**	ND
Pyridine			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 12
431 Kent Avenue, Brooklyn, New York
ZONE D
Soil Analytical Results
Semi-Volatile Organic Compounds
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone D B1(0-2') µg/Kg	Zone D B1(13-15') µg/Kg	Zone D B2(0-2') µg/Kg	Zone D B2(13-15') µg/Kg	Zone D B3(0-2') µg/Kg	Zone D B3(13-15') µg/Kg	Zone D B4(0-2) µg/Kg	Zone D B4(13-15') µg/Kg
1,2,4,5-Tetrachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol			ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol			ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol			ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene			ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene			ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol			ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene			**410**	ND	**440**	ND	ND	ND	**1,300**	ND
2-Methylphenol (o-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine			ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol			ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline			ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether			ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline			ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol			ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	100,000	**680**	ND	**770**	ND	ND	ND	**5,800**	ND
Acenaphthylene	100,000	100,000	ND	ND	**620**	ND	ND	ND	**730**	ND
Acetophenone			ND	ND	ND	ND	ND	ND	ND	ND
Aniline			ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100,000	100,000	**1,700**	ND	**1,900**	ND	ND	ND	**9,800**	ND
Azobenzene			ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1,000	1,000	**5,400**	ND	**7,500**	ND	**760**	ND	**19,000**	ND
Benzidine			ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	1,000	**5,100**	ND	**7,200**	ND	**710**	ND	**16,000**	ND
Benzo(b)fluoranthene	1,000	1,000	**5,800**	ND	**9,800**	ND	**920**	ND	**21,000**	ND
Benzo(g,h,i)perylene	100,000	100,000	**1,900**	ND	**2,400**	ND	**330**	ND	**3,200**	ND
Benzo(k)fluoranthene	800	3,900	**1,700**	ND	**27,000**	ND	**280**	ND	**8,400**	ND
Benzoic Acid			ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane			ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether			ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether			ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate			ND	ND	ND	ND	ND	ND	ND	ND
Carbazole			ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1,000	3,900	**5,600**	ND	**7,900**	ND	**800**	ND	**16,000**	ND
Dibenzo(a,h)anthracene	330	330	**600**	ND	**940**	ND	ND	ND	ND	ND
Dibenzofuran			**480**	ND	**480**	ND	ND	ND	ND	ND
Diethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate			ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate			ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate			ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	100,000	**11,000**	ND	**11,000**	ND	**930**	ND	**48,000**	ND
Fluorene	30,000	100,000	**790**	ND	**810**	ND	ND	ND	**5,900**	ND
Hexachlorobenzene			ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene			ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane			ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	500	**1,700**	ND	**2,600**	ND	**310**	ND	**3,900**	ND
Isophorone			ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	100,000	**840**	ND	**650**	**300**	ND	ND	ND	ND
Nitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine			ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine			ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine			ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene			ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	800	6,700	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	100,000	**11,000**	ND	**11,000**	ND	**830**	ND	**43,000**	ND
Phenol	330	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100,000	100,000	**11,000**	ND	**9,400**	ND	**820**	ND	**40,000**	ND
Pyridine			ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 13
431 Kent Avenue, Brooklyn, New York
ZONE A
Soil Analytical Results
Pesticides / PCBs
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone A B1(0-2') µg/Kg	Zone A B1(13-15') µg/Kg	Zone A B2(0-2') µg/Kg	Zone A B2(13-15') µg/Kg	Zone A B3(0-2') µg/Kg	Zone A B3(13-15') µg/Kg	Zone A B4(2-4') PCB3 µg/Kg	Zone A B4(13-15') PCB3 µg/Kg	Zone A PCB1(0-2') µg/Kg	Zone A PCB2(2-4') µg/Kg	Zone A PCB4(0-2') µg/Kg
PCB-1016	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDD	3.3	13,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
4,4-DDE	3.3	8,900	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
4,4-DDT	3.3	7,900	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
a-BHC	20	480	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Alachlor			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Aldrin	5	97	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
b-BHC	36	360	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Chlordane	94	4,200	ND	ND	**130**	ND	ND	ND	ND	ND	-	-	-
d-BHC	40	100,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Dieldrin	5	200	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endosulfan I	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endosulfan II	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endosulfan Sulfate	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endrin	14	11,000	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endrin aldehyde			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Endrin ketone			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
gamma-BHC			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Heptachlor	42	2,100	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Heptachlor epoxide			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Methoxychlor			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-
Toxaphene			ND	ND	ND	ND	ND	ND	ND	ND	-	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

"-" - Not Analyzed

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 14
431 Kent Avenue, Brooklyn, New York
ZONE B
Soil Analytical Results
Pesticides / PCBs
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone B B1(0-2') µg/Kg	Zone B B1(13-15') µg/Kg	Zone B B2(0-2') T2 µg/Kg	Zone B B2(13-15') T2 µg/Kg	Zone B B3(0-2') A1 µg/Kg	Zone B B3(13-15') A1 µg/Kg	Zone B B4(0-2') Ben µg/Kg	Zone B B4(13-15') Ben µg/Kg	Zone B B5(0-2') P2 µg/Kg	Zone B B6(0-2') P1 µg/Kg	Zone B B6(0-2') P1 µg/Kg	Zone B B7(0-2') µg/Kg	Zone B B7(13-15') µg/Kg	Field Duplicate µg/Kg
PCB-1016	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDD	3.3	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDE	3.3	8,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDT	3.3	7,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-BHC	20	480	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	5	97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	36	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	94	4,200	ND	ND	ND	ND	ND	ND	ND	ND	**66**	**69**	ND	ND	ND	ND
d-BHC	40	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	5	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	14	11,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	42	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 15
431 Kent Avenue, Brooklyn, New York
ZONE C
Soil Analytical Results
Pesticides / PCBs
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone C B1(0-2') µg/Kg	Zone C B1(13-15') µg/Kg	Zone C B2(0-2') µg/Kg	Zone C B2(13-15') µg/Kg	Zone C B3(0-2') µg/Kg	Zone C B3(13-15') µg/Kg	Zone C B4(0-2') µg/Kg	Zone C B5(0-2') µg/Kg	Zone C B5(13-15') µg/Kg	Zone C B6(0-2') µg/Kg	Zone C B6(13-15') µg/Kg
PCB-1016	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDD	3.3	13,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDE	3.3	8,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDT	3.3	7,900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-BHC	20	480	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	5	97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	36	360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	94	4,200	ND	ND	ND	ND	ND	ND	ND	ND	ND	**270**	ND
d-BHC	40	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	5	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	14	11,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	42	2,100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

"-" - Not Analyzed

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 16
431 Kent Avenue, Brooklyn, New York
ZONE D
Soil Analytical Results
Pesticides / PCBs
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone D B1(0-2') µg/Kg	Zone D B1(13-15') µg/Kg	Zone D B2(0-2') µg/Kg	Zone D B2(13-15') µg/Kg	Zone D B3(0-2') µg/Kg	Zone D B3(13-15') µg/Kg	Zone D B4(0-2) µg/Kg	Zone D B4(13-15') µg/Kg
PCB-1016	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDD	3.3	13,000	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDE	3.3	8,900	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDT	3.3	7,900	ND	ND	ND	ND	ND	ND	ND	ND
a-BHC	20	480	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor			ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	5	97	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	36	360	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	94	4,200	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	40	100,000	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	5	200	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	2,400	24,000	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	14	11,000	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde			ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone			ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC			ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	42	2,100	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide			ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor			ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene			ND	ND	ND	ND	ND	ND	ND	ND

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 17
431 Kent Avenue, Brooklyn, New York
ZONE A
Soil Analytical Results
Metals
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone A B1(0-2') mg/Kg	Zone A B1(13-15') mg/Kg	Zone A B2(0-2') mg/Kg	Zone A B2(13-15') mg/Kg	Zone A B3(0-2') mg/Kg	Zone A B3(13-15') mg/Kg	Zone A B4(2-4') PCB3 mg/Kg	Zone A B4(13-15') PCB3 mg/Kg
Aluminum			**5,860**	**8,940**	**9,630**	**14,700**	**11,800**	**17,100**	**5,410**	**12,300**
Antimony			**10.5**	BDL	BDL	BDL	BDL	BDL	**89**	BDL
Arsenic	13	16	**10.4**	BDL	**3.74**	**2.67**	**11.9**	**1.5**	**24.1**	**5.63**
Barium	350	400	**239**	**52.8**	**206**	**39.7**	**487**	**65.8**	**348**	**113**
Beryllium	7.2	72	**0.7**	**0.48**	**0.46**	**0.51**	**0.55**	BDL	BDL	BDL
Cadmium	2.5 c	4.3	**1.82**	**0.99**	**0.93**	**0.63**	**2.66**	**0.58**	**3.93**	**1.78**
Calcium			**10,800**	**835**	**14,500**	**935**	**4,540**	**1,200**	**17,800**	**1,250**
Chromium	30 c	110	**12.4**	**34.5**	**18.8**	**15.9**	**37.7**	**19.1**	**32.3**	**12.7**
Cobalt			**10.7**	**8.79**	**6.35**	**6.36**	**9.27**	**8.21**	**16.3**	**18.6**
Copper	50	270	**136**	**19.3**	**69.9**	**13.8**	**157**	**9.62**	**352**	**42.9**
Iron			**16,500**	**37,700**	**24,400**	**23,100**	**55,800**	**22,900**	**71,700**	**48,400**
Lead	63 c	400	**1,130**	**3.64**	**279**	**8.8**	**708**	**7.68**	**1,660**	**9**
Magnesium			**3,660**	**2,080**	**3,620**	**3,930**	**3,070**	**3,320**	**1,850**	**2,460**
Manganese	1600 c	2,000	**371**	**654**	**445**	**224**	**616**	**825**	**295**	**4,410**
Mercury	0.18 c	0.81	**0.3**	BDL	**0.87**	BDL	**1.96**	BDL	**1.91**	BDL
Nickel	30	310	**21.2**	**20.1**	**16.7**	**14.9**	**29.9**	**15.8**	**44**	**20.1**
Potassium			**1,410**	**1,640**	**1,460**	**1,240**	**1,430**	**1,510**	**829**	**925**
Selenium	3.9c	180	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	2	180	**0.46**	BDL	BDL	BDL	BDL	BDL	**0.47**	BDL
Sodium			**290**	**77**	**427**	**122**	**426**	**129**	**302**	**76.3**
Thallium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium			**20.7**	**43.1**	**32.6**	**26.4**	**34.7**	**27.9**	**28.6**	**46.3**
Zinc	109 c	10,000	**608**	**37.3**	**190**	**40.5**	**684**	**58.7**	**539**	**81.4**

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

BDL - Below Detection Limit

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 18
431 Kent Avenue, Brooklyn, New York
ZONE A - SUPPLEMENTAL
Soil Analytical Results
Metals
JUNE 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	ZA-B5			ZA-B6		
			(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg	(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg
Aluminum			-	-	-	-	-	-
Antimony			-	-	-	-	-	-
Arsenic	13	16	-	-	-	-	-	-
Barium	350	400	-	-	-	-	-	-
Beryllium	7.2	72	-	-	-	-	-	-
Cadmium	2.5 c	4.3	-	-	-	-	-	-
Calcium			-	-	-	-	-	-
Cobalt			-	-	-	-	-	-
Chromium	30 c	180 - trivalent	**32.4**	**15.2**	**9.63**	-	-	-
Chromium - Hexavalent	1	110	<0.42	<0.46	<0.42	-	-	-
Copper	50	270	-	-	-	-	-	-
Iron			-	-	-	-	-	-
Lead	63 c	400	-	-	-	-	-	-
Mercury	0.18 c	0.81	-	-	-	-	-	-
Magnesium			-	-	-	-	-	-
Manganese	1600 c	2,000	-	-	-	**2,360**	**316**	**393**
Nickel	30	310	-	-	-	-	-	-
Potassium			-	-	-	-	-	-
Silver	2	180	-	-	-	-	-	-
Sodium			-	-	-	-	-	-
Selenium	3.9c	180	-	-	-	-	-	-
Thallium			-	-	-	-	-	-
Vanadium			-	-	-	-	-	-
Zinc	109 c	10,000	-	-	-	-	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Not analyzed

J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.

S - This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

N - The concentration is based on the response for the nearest internal. This flag is used on the TIC form for all compounds identified.

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 19
431 Kent Avenue, Brooklyn, New York
ZONE B
Soil Analytical Results
Metals
JABUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone B B1(0-2') mg/Kg	Zone B B1(13-15') mg/Kg	Zone B B2(0-2') T2 mg/Kg	Zone B B2(13-15') T2 mg/Kg	Zone B B3(0-2') A1 mg/Kg	Zone B B3(13-15') A1 mg/Kg	Zone B B4(0-2') Ben mg/Kg	Zone B B4(13-15') Ben mg/Kg	Zone B B5(0-2') P2 mg/Kg	Zone B B6(0-2') P1 mg/Kg	Zone B B7(0-2') mg/Kg	Zone B B7(13-15') mg/Kg	Zone B Field Duplicate mg/Kg	Zone B Lead 1 (0-2') mg/Kg	Zone B Lead 2 (0-2') mg/Kg	Zone B Lead 3 (0-2') mg/Kg
Aluminum			15,400	3,400	5,550	7,640	14,800	6,110	9,100	12,900	7,510	8,230	7,080	28,200	4,280	12,900	11,000	11,900
Antimony			BDL	BDL	46.5	BDL	BDL	BDL	BDL	BDL	BDL	4.5	BDL	BDL	BDL	BDL	49.3	BDL
Arsenic	13	16	11.5	BDL	16.8	BDL	1.11	3.74	17.3	3.08	4.17	5.73	5.49	BDL	BDL	6.78	12.2	4.45
Barium	350	400	1,360	21.6	161	47.6	83.2	17.2	1,870	15.7	1,030	1,450	61.1	234	24.7	760	2,160	110
Beryllium	7.2	72	0.45	BDL	0.79	BDL	0.46	BDL	0.5	0.35	0.33	0.32	BDL	BDL	BDL	0.91	1.96	0.43
Cadmium	2.5 c	4.3	0.83	BDL	2.12	BDL	0.63	BDL	3.36	0.7	1.96	1.46	1.16	0.74	BDL	1.52	2.47	0.76
Calcium			1,460	509	10,100	622	24,000	349	21,800	875	19,700	41,500	13,200	4,640	493	11,400	13,900	15,400
Chromium	30 c	110	20.6	6.81	16.2	10.1	18.1	7.53	41.7	12.1	20.5	22.5	18.1	57	9.88	13.4	45.7	16.8
Cobalt			6.34	2.17	10.6	4.73	4.31	5.22	9.09	7.71	8.14	7.11	5.94	26.2	3.92	5.96	20	7.09
Copper	50	270	39.5	8.51	669	5.16	66.9	6.53	181	14	73.8	105	42.1	33.1	9.2	104	903	74.4
Iron			24,100	6,000	22,000	9,460	14,000	13,200	21,900	22,100	15,700	17,200	15,600	46,300	9,290	8,420	36,600	19,400
Lead	63 c	400	606	3.11	3,630	6.09	107	7.2	1,480	8.39	231	786	84.3	BDL	3.4	40.8	1,510	306
Magnesium			2,850	1,170	858	2,200	4,280	1,840	3,310	3,450	2,670	4,070	3,500	13,100	1,500	1,060	3,540	3,930
Manganese	1600 c	2,000	205	109	167	127	295	239	417	538	335	364	311	621	235	96.3	558	447
Mercury	0.18c	1	1.49	BDL	0.46	BDL	0.35	BDL	0.99	BDL	0.85	0.57	1.51	BDL	BDL	BDL	0.89	0.46
Nickel	30	310	16	5.79	99.5	11.1	10.7	10.8	55.8	15.8	16.7	21.9	16.4	29.3	10.5	21.8	86.2	15.6
Potassium			1,160	588	941	837	1,570	762	1,500	928	1,140	1,590	1,130	4,900	693	1,090	1,570	1,420
Selenium	3.9c	180	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	2	180	0.91	BDL	3.14	BDL	BDL	BDL	BDL	BDL	0.35	0.47	BDL	3.89	BDL	0.58	0.93	BDL
Sodium			120	46.9	672	69	1,830	46.5	503	647	404	720	404	318	68.2	602	677	363
Thallium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium			29.6	9.55	31.9	13.8	20.8	11.6	28	19.2	29.1	22.9	18.4	126	16.9	36.9	31.7	25.7
Zinc	109 c	10,000	173	15.7	630	30.9	112	26.2	1,600	44.3	271	508	141	97	19.6	277	4,870	165

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

BDL - Below Detection Limit

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 20
431 Kent Avenue, Brooklyn, New York
ZONE B - SUPPLEMENTAL
Soil Analytical Results
Metals
JUNE 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	ZB-B8		
			(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg
Aluminum			-	-	-
Antimony			-	-	-
Arsenic	13	16	-	-	-
Barium	350	400	-	-	-
Beryllium	7.2	72	-	-	-
Cadmium	2.5 c	4.3	-	-	-
Calcium			-	-	-
Cobalt			-	-	-
Chromium	30 c	180 - trivalent	**36.8**	**13.2**	**11.7**
Chromium - Hexavalent	1	110	<0.45	<0.42	<0.42
Copper	50	270	-	-	-
Iron			-	-	-
Lead	63 c	400	-	-	-
Mercury	0.18 c	0.81	-	-	-
Magnesium			-	-	-
Manganese	1600 c	2,000	-	-	-
Nickel	30	310	-	-	-
Potassium			-	-	-
Silver	2	180	<0.38	<0.37	<0.34
Sodium			-	-	-
Selenium	3.9c	180	-	-	-
Thallium			-	-	-
Vanadium			-	-	-
Zinc	109 c	10,000	-	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Not analyzed

J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identif

S - This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

N - The concentration is based on the response for the nearest internal. This flag is used on the TIC form for all compounds identified.

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 21
431 Kent Avenue, Brooklyn, New York
ZONE C
Soil Analytical Results
Metals
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone C B1(0-2') mg/Kg	Zone C B1(13-15') mg/Kg	Zone C B2(0-2') mg/Kg	Zone C B2(13-15') mg/Kg	Zone C B3(0-2') mg/Kg	Zone C B3(13-15') mg/Kg	Zone C B4(0-2') mg/Kg	Zone C B5(0-2') mg/Kg	Zone C B5(13-15') mg/Kg	Zone C B6(0-2') mg/Kg	Zone C B6(13-15') mg/Kg
Aluminum			6,360	14,200	9,820	8,850	7,690	7,310	10,300	8,930	6,690	7,290	5,990
Antimony			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	13	16	1.6	BDL	4.25	BDL	11	BDL	5.48	11.9	3.09	6.55	2.86
Barium	350	400	39.7	102	103	49.6	171	48.2	98.6	352	14.8	194	16.8
Beryllium	7.2	72	0.31	0.58	0.43	0.44	0.48	0.37	0.45	0.46	0.33	0.37	0.31
Cadmium	2.5 c	4.3	0.53	0.95	2.17	0.6	1.13	0.59	0.56	1.42	0.41	1.7	0.42
Calcium			4,660	2,130	22,600	458	35,200	1,020	42,700	21,400	383	24,100	206
Chromium	30 c	110	14.8	125	29.9	26.9	18.9	17.1	14.4	24	8.69	26.6	7.71
Cobalt			4.58	15.4	6.41	8.01	5.58	5.88	6.1	8.86	5.55	5.34	6.34
Copper	50	270	25.3	27.5	57.3	12.8	172	9.24	38.2	180	7.38	121	8.44
Iron			14,200	38,800	20,000	23,700	22,800	21,700	17,500	32,200	13,900	13,800	12,600
Lead	63 c	400	32.1	5.77	181	3.5	2,140	3.45	10.3	603	5.8	266	5.89
Magnesium			1,990	5,550	3,680	2,900	4,270	2,390	7,810	3,540	2,050	4,080	2,160
Manganese	1600 c	2,000	326	427	403	348	367	469	551	392	238	227	326
Mercury	0.18 c	0.81	0.27	BDL	0.4	BDL	3.47	BDL	0.09	0.98	BDL	1.41	BDL
Nickel	30	310	9.56	69.2	18.4	12.9	18.5	12.5	11.1	19.1	10.1	24.7	11.1
Potassium			1,040	1,620	1,330	2,600	1,410	1,410	2,030	1,610	861	1,270	855
Selenium	3.9c	180	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	2	180	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.63	BDL
Sodium			190	277	375	51.5	707	88.7	1,300	833	86	1,140	142
Thallium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium			18.1	61.1	25.6	43.8	30.6	27.5	27.7	35.5	13.2	23.3	11.7
Zinc	109 c	10,000	53.1	79.1	115	37.3	270	22	29.7	285	24	286	27.1

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

BDL - Below Detection Limit

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 22
431 Kent Avenue, Brooklyn, New York
ZONE C - SUPPLEMENTAL
Soil Analytical Results
Metals
JUNE 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	ZC-B7			ZC-B8			ZC-B9			ZC-B10		
			(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg	(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg	(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg	(13-15) mg/Kg	(15-17) mg/Kg	(17-19) mg/Kg
Aluminum			-	-	-	-	-	-	-	-	-	-	-	-
Antimony			-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	13	16	-	-	-	-	-	-	-	-	-	-	-	-
Barium	350	400	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	7.2	72	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	2.5 c	4.3	-	-	-	-	-	-	-	-	-	-	-	-
Calcium			-	-	-	-	-	-	-	-	-	-	-	-
Cobalt			-	-	-	-	-	-	-	-	-	-	-	-
Chromium	30 c	180 - trivalent	**5.08**	**5.03**	**8.66**	**12.2**	**6.70**	**10.7**	**19.8**	**8.64**	**10.1**	**7.13**	**8.22**	**5.00**
Chromium - Hexavalent	1	110	<0.41	<0.38	<0.38	**0.430**	<0.39	<0.40	**0.620**	<0.37	<0.37	<0.36	<0.41	<0.41
Copper	50	270	-	-	-	-	-	-	-	-	-	-	-	-
Iron			-	-	-	-	-	-	-	-	-	-	-	-
Lead	63 c	400	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.18 c	0.81	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium			-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1600 c	2,000	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	30	310	**8.98**	**10.2**	**5.37**	**13.4**	**10.1**	**14.3**	**11.8**	**6.69**	**6.88**	**13.7**	**9.77**	**6.22**
Potassium			-	-	-	-	-	-	-	-	-	-	-	-
Silver	2	180	-	-	-	-	-	-	-	-	-	-	-	-
Sodium			-	-	-	-	-	-	-	-	-	-	-	-
Selenium	3.9c	180	-	-	-	-	-	-	-	-	-	-	-	-
Thallium			-	-	-	-	-	-	-	-	-	-	-	-
Vanadium			-	-	-	-	-	-	-	-	-	-	-	-
Zinc	109 c	10,000	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

NA - Not analyzed

J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.

S - This compound is a solvent that is used in the laboratory. Laboratory contamination is suspected if concentration is less than five times the reporting level.

N - The concentration is based on the response for the nearest internal. This flag is used on the TIC form for all compounds identified.

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 23
431 Kent Avenue, Brooklyn, New York
ZONE D
Soil Analytical Results
Metals
JANUARY 2012

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	Zone D B1(0-2') mg/Kg	Zone D B1(13-15') mg/Kg	Zone D B2(0-2') mg/Kg	Zone D B2(13-15') mg/Kg	Zone D B3(0-2') mg/Kg	Zone D B3(13-15') mg/Kg	Zone D B4(0-2) mg/Kg	Zone D B4(13-15') mg/Kg
Aluminum			**8,940**	**4,730**	**8,410**	**4,810**	**5,770**	**5,810**	**9,110**	**8,010**
Antimony			**4.5**	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	13	16	**5.42**	BDL	**9.86**	**2.23**	**3.26**	**2.4**	**4.06**	BDL
Barium	350	400	**308**	**17.8**	**322**	**29**	**54.3**	**38.5**	**117**	**57.6**
Beryllium	7.2	72	**0.57**	BDL	**0.81**	**0.33**	**0.32**	**0.31**	**0.45**	**0.41**
Cadmium	2.5 c	4.3	**1.5**	BDL	**2.12**	**0.47**	**0.53**	**0.45**	**4.35**	**0.84**
Calcium			**20,800**	**528**	**37,500**	**592**	**39,300**	**441**	**54,100**	**890**
Chromium	30 c	110	**27.5**	**10.1**	**26.1**	**9.42**	**23.3**	**7.88**	**24.5**	**24.3**
Cobalt			**7.87**	**2.98**	**8.25**	**4.55**	**6.2**	**6.2**	**4.37**	**7.63**
Copper	50	270	**272**	**9.28**	**256**	**8.25**	**54.3**	**8.31**	**73**	**11.3**
Iron			**30,100**	**8,930**	**23,700**	**12,800**	**12,800**	**14,200**	**13,200**	**33,900**
Lead	63 c	400	**486**	**3.41**	**622**	**4**	**68.9**	**6.46**	**130**	**2.61**
Magnesium			**3,110**	**1,220**	**3,780**	**1,680**	**8,790**	**2,030**	**4,180**	**2,700**
Manganese	1600 c	2,000	**425**	**147**	**355**	**308**	**226**	**318**	**247**	**585**
Mercury	0.18c	0.81	**1.13**	BDL	**1.45**	BDL	**0.28**	BDL	**9.5**	BDL
Nickel	30	310	**19.1**	**6.96**	**29**	**11**	**11.3**	**12.2**	**14.9**	**13.1**
Potassium			**1,470**	**734**	**1,190**	**973**	**1,240**	**931**	**1,280**	**1,800**
Selenium	3.9c	180	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	2	180	**0.53**	BDL	**3.41**	BDL	BDL	BDL	**0.83**	BDL
Sodium			**343**	**80.4**	**696**	**49.5**	**580**	**53.4**	**1,190**	**76.4**
Thallium			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium			**31.2**	**16.3**	**38.3**	**15.5**	**18.6**	**12.2**	**19.1**	**36.9**
Zinc	109 c	10,000	**524**	**11.6**	**899**	**23.4**	**55.2**	**27.4**	**287**	**39.9**

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

BDL - Below Detection Limit

NA - Guidance value not available

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 24
431 Kent Avenue, Brooklyn, New York
Parameters Dected Above Track 1 Soil Cleanup Objectives

COMPOUND	Range in Exceedences	Frequency of Detection	Zone A B1(0-2') mg/Kg	Zone A B1(13-15') mg/Kg	Zone A B2(0-2') mg/Kg	Zone A B3(0-2') mg/Kg	Zone A B3(10-12') µg/Kg	Zone A B4(2-4') PCB3 mg/Kg	Zone A B4(13-15') PCB3 mg/Kg	Zone B B1(0-2') mg/Kg	Zone B B2(0-2') T2 mg/Kg	Zone B B3(0-2') A1 mg/Kg	Zone B B4(0-2') Ben mg/Kg	Zone B B5(0-2') P2 mg/Kg	Zone B B6(0-2') P1 mg/Kg	Zone B B7(0-2') mg/Kg	Zone B B7(13-15') mg/Kg	Zone B Lead 1 (0-2') mg/Kg
METALS																		
Arsenic	16.8 - 24.1	3						24.1			16.8		17.3					
Barium	487 - 1,870	7				487				1,360			1,870	1,030	1,450			760
Cadmium	2.66 - 4.35	4				2.66		3.93					3.36					
Chromium	32.3 - 125	9		34.5		37.7		32.3					41.7				57	
Copper	54.3 - 903	18	136		69.9	157		352				66.9	181	73.8	105			104
Lead	68.9 - 3,630	21	1,130		279	708		1,660		606	3,630	107	1,480	231	786	84.3		
Manganese	4,410	1							4,410									
Mercury	0.27 - 9.5	22	0.3		0.87	1.96		1.91		1.49	0.46	0.35	0.99	0.85	0.57	1.51		
Nickel	44 - 99.5	5						44			99.5		55.8					
Silver	3.14 - 3.89	3									3.14						3.89	
SVOCS																		
Acenaphthene	64,000	1					64,000											
Anthracene	280,000	1					280,000											
Benzo(a)anthracene	1,200 - 280,000	14	1,500			9,400	280,000	1,500					1,900		1,200	3,600		
Benzo(a)pyrene	1,200 - 240,000	14	1,300			9,300	240,000	1,400					2,000		1,200	3,500		
Benzo(b)fluoranthene	1,700 - 300,000	14	2,000			12,000	300,000	2,000					2,800		1,700	5,200		
Benzo(g,h,i)perylene	110,000	1					110,000											
Benzo(k)fluoranthene	850 - 100,000	12	850			3,400	100,000						1,100			1,500		
Chrysene	1,000 - 230,000	14	1,300			8,600	230,000	1,700					2,000		1000	3,500		
Dibenzo(a,h)anthracene	350 - 29,000	9				760	29,000						350			370		
Fluoranthene	660,000	1					660,000											
Fluorene	67,000	1					67,000											
Indeno(1,2,3-cd)pyrene	540 - 100,000	14	550			3,100	100,000	560					1200		550	1,200		
Naphthalene	35,000	1					35,000											
Phenanthrene	700,000	1					700,000											
Pyrene	530,000	1					530,000											
VOCS																		
Tetrachloroethene	2,000	1					2,000											
Pesticides																		
Chlordane	130 - 270	2									130							

COMPOUND	Range in Exceedences	Frequency of Detection	Zone B Lead 2 mg/Kg	Zone B Lead 3 mg/Kg	Zone C B1(0-2') mg/Kg	Zone C B1(13-15') mg/Kg	Zone C B2(0-2') mg/Kg	Zone C B3(0-2') mg/Kg	Zone C B5(0-2') mg/Kg	Zone C B6(0-2') mg/Kg	Zone D B1(0-2') mg/Kg	Zone D B2(0-2') mg/Kg	Zone D B3(0-2') mg/Kg	Zone D B4(0-2) mg/Kg	ZA-B5 (13-15) mg/Kg	ZA-B6 (13-15) mg/Kg	ZB-B8 (13-15) mg/Kg
METALS																	
Arsenic	16.8 - 24.1	3															
Barium	487 - 1,870	7	2,160														
Cadmium	2.66 - 4.35	4												4.35			
Chromium	32.3 - 125	9	45.7			125									32.4		36.8
Copper	54.3 - 903	18	903	74.4			57.3	172	180	121	272	256	54.3				
Lead	68.9 - 3,630	21	1,510	306			181	2,140	603	266	486	622	68.9	130			
Manganese	4,410	1														2,360	
Mercury	0.27 - 9.5	22	0.89	0.46	0.27		0.4	3.47	0.98	1.41	1.13	1.45	0.28	9.5			
Nickel	44 - 99.5	5	86.2			69.2											
Silver	3.14 - 3.89	3										3.41					
SVOCS																	
Acenaphthene	64,000	1															
Anthracene	280,000	1															
Benzo(a)anthracene	1,200 - 280,000	14					2,500	12,000	10,000	4,600	5,400	7,500		19,000			
Benzo(a)pyrene	1,200 - 240,000	14					2,300	10,000	9,800	4,100	5,100	7,200		16,000			
Benzo(b)fluoranthene	1,700 - 300,000	14					3,300	14,000	12,000	5,100	5,800	9,800		21,000			
Benzo(g,h,i)perylene	110,000	1															
Benzo(k)fluoranthene	850 - 100,000	12					1,300	4,400	3,600	1,600	1,700	27,000		8,400			
Chrysene	1,000 - 230,000	14					2,200	11,000	9,200	4,700	5,600	7,900		16,000			
Dibenzo(a,h)anthracene	350 - 29,000	9						1,600	1,300	720	600	940					
Fluoranthene	660,000	1															
Fluorene	67,000	1															
Indeno(1,2,3-cd)pyrene	540 - 100,000	14					540	5,600	4,200	2,200	1,700	2,600		3,900			
Naphthalene	35,000	1															
Phenanthrene	700,000	1															
Pyrene	530,000	1															
VOCS																	
Tetrachloroethene	2,000	1															
Pesticides																	
Chlordane	130 - 270	2								270							

Table 25
431 Kent Avenue Brooklyn, NY
ZONES A-D
Groundwater Analaytical Results
Volatile Organic Compounds
JANUARY 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
1,1,1,2-Tetrachlorothane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	**6.5**	**1.6**	ND	**9.8**	ND	**1.8**	**1.1**	**8**	**8.8**	**13**	**9.8**	**5.6**
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.1**	**1.1**	ND
cis-1,3-Dichloropropene	0.4[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromoethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene		ND	ND	**2.9**	ND	ND	**ND**	**ND**	ND	ND	ND	ND	ND
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**76**	**26**	**13**	**4.9**	**2.1**	**14**	**24**	**15**	**14**	**6.1**	**24**	**18**
Tetrahydrofuran (THF)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.4[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**4.9**	**4.3**	ND	**6.5**	**25**	**6.9**	**4.1**	**15**	**25**	**72**	**16**	**15**
Trichlorofluoromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard
(a) - Refers to the sum of cis and trans isomers

TABLE 26
431 Kent Avenue, Brooklyn, NY
Groundwater Analytical Results
Volatile Organic Compounds
JUNE 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Trip Blank µg/L	MW1S µg/L	MW2S µg/L	MW3S µg/L	MW3D µg/L	MW4S µg/L	MW4D µg/L	MW5S µg/L	MW6S µg/L	MW6D µg/L	MW7S µg/L	MW7D µg/L	MW8S µg/L	MW9S µg/L	MW10S µg/L	MW11S µg/L
1,1,1,2-Tetrachlorothane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	**17**	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene		ND	ND	ND	ND	ND	ND	**3.1**	ND	ND	ND	ND	ND	ND	ND	**0.44** J	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone		**0.74** JS	**1.2** JS	**2.3** JS	**4.3** JS	**3.4** JS	**2.5** JS	ND	**2.2** JS	**1.3** JS	**2.8** JS	**2.0** JS	**1.5** JS	**1.8** JS	**3.8** JS	**2.4** JS	**3.7** JS
Acrolein		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**	ND
Acrylonitrile	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	60	ND	ND	ND	ND	ND	ND	**4.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	**6.2**	**0.51** J	**0.52** J	**1.8** J	**1.8** J	ND	**0.39** J	**16**	**7.9**	**1.6** J	**8.0**	**19**	**7.8**	**0.90** J	**17**
Chloromethane	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	**0.90** J	ND	ND	ND	ND	ND	ND	**1.3**	**1.1**	ND	**0.66** J	**0.78** J	**0.50** J	**3.6**	**2.0**
cis-1,3-Dichloropropene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	**0.96** J	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)		ND	ND	ND	ND	**0.67** J	ND	ND	ND	ND	**0.56** J	ND	ND	ND	ND	**0.60** J	ND
Methyl t-butyl ether (MTBE)	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	**0.35** JS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	**0.34** J	**0.21** J	ND	ND	ND	ND	**3.6**	ND	**0.26** J	ND	ND	ND	ND	**0.24** J	ND	**1.7**
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND	**4.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	5	ND	ND	ND	ND	ND	ND	**4.9**	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene		ND	ND	ND	ND	ND	ND	**14**	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	5	ND	ND	ND	ND	ND	ND	**6.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5	ND	ND	ND	ND	ND	ND	**1.3** J	ND	ND	ND	ND	ND	ND	ND	**0.63** J	ND
Tetrachloroethene	5	ND	**91**	**9.8**	**13**	**44**	**11**	**20**	**11**	**64**	**63**	**18**	**48**	**29**	**18**	**7.2**	**43**
Tetrahydrofuran (THF)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trabs-1,4-dichloro-2-butene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	**6.9**	**1.8**	**1.9**	**6.5**	**0.53** J	**1.5** J	**1.9**	**4.2**	**3.1**	**6.1**	**3.3**	**5.6**	**16**	**15**	**24**
Trichlorofluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
ND - Not detected
J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 27
431 Kent Avenue Brooklyn, NY
Groundwater Analaytical Results
Volatile Organic Compounds
AUGUST 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L	MW2s µg/L	MW6s µg/L	MW7s µg/L	MW9s µg/L	MW12 µg/L	MW13 µg/L	MW14 µg/L	MW15 µg/L
1,1,1,2-Tetrachlorothane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone (Methyl Butyl Ketone)	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone		ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile		ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide		ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	**10**	ND	**10**	**1**	**8.2**	**4.2**	**1.1**	**6.6**	**17**
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	**1.7**	**13**	ND	ND
cis-1,3-Dichloropropene	0.4[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromoethane		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane		ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
m&p-Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone (2-Butanone)	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene		ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**9.1**	**6.1**	**20**	**16**	**19**	**28**	**340**	**52**	**14**
Tetrahydrofuran (THF)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes		ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.4[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	**3.1**	**6.5**	**17**	**5.2**	**26**	**2.7**	**1.6**
Trichlorofluoromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

ND - Not detected

(a) - Refers to the sum of cis and trans isomers

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 28
431 Kent Avenue, Brooklyn, NY
ZONES A-D
Groundwater Analytical Results
Semi-Volatile Organic Compounds
JANUARY 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	0.94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	5	ND	**0.03**	**0.16**	ND	ND	ND	ND	ND	**0.17**	**0.04**	ND	ND
Anthracene	50	ND	ND	**5.7**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Azobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	0.002	**0.11**	**0.35**	**9.6**	**0.08**	**0.29**	**0.32**	**0.04**	ND	**2.7**	**0.33**	ND	**0.03**
Benzidine	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene		**0.1**	**0.32**	**8.7**	**0.07**	**0.27**	**0.3**	**0.03**	ND	**2.5**	**0.3**	ND	ND
Benzo(b)fluoranthene	0.002	**0.13**	**0.44**	**9.7**	**0.1**	**0.4**	**0.39**	**0.05**	ND	**3.3**	**0.44**	ND	**0.02**
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.002	**0.04**	**0.18**	**3.6**	**0.04**	**0.11**	**0.14**	**0.05**	ND	**1.1**	**0.14**	ND	ND
Benzoic Acid		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Alcohol		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroisopropyl)ether		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	5	**6.1**	**7.9**	ND	ND	ND	ND	ND	ND	ND	ND	**6.7**	ND
Chrysene	0.002	**0.1**	**0.34**	**8.7**	**0.08**	**0.3**	**0.31**	**0.03**	ND	**2.7**	**0.34**	ND	**0.02**
Dibenzo(a,h)anthracene		ND	**0.06**	**1.6**	ND	**0.06**	**0.05**	ND	ND	**0.54**	0.02	ND	ND
Dibenzofuran		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	ND	ND	**26**	ND	ND	ND	ND	ND	**6.8**	ND	ND	ND
Fluorene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	**0.06**	**0.18**	**5.1**	**0.04**	**0.18**	**0.15**	ND	ND	**1.8**	**0.21**	ND	ND
Isophorone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	ND	ND	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	**0.47**	**0.82**	**29**	**0.16**	**0.41**	**0.42**	**0.12**	ND	**5.1**	**1.2**	**0.15**	**0.15**
Pyrene	50	ND	ND	**21**	ND	ND	ND	ND	ND	**5.7**	ND	ND	ND

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 29
431 Kent Avenue, Brooklyn, NY
Groundwater Analytical Results
Semi-Volatile Organic Compounds
JUNE 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1S µg/L	MW2S µg/L	MW3S µg/L	MW4S µg/L	MW5S µg/L	MW6S µg/L	MW7S µg/L	MW8S µg/L	MW9S µg/L	MW10S µg/L	MW11S µg/L
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	0.002	**0.06**	**0.15**	**0.04**	**0.02**	**0.02**	ND	**0.04**	ND	**0.11**	ND	ND
Benzo(a)pyrene		ND	**0.14**	ND	ND	ND	ND	**0.03**	ND	**0.11**	ND	ND
Benzo(b)fluoranthene	0.002	ND	**0.19**	**0.02**	ND	ND	ND	**0.03**	ND	**0.12**	ND	ND
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.002	ND	**0.07**	ND	ND	ND	ND	ND	ND	**0.05**	ND	ND
Chrysene	0.002	**0.04**	**0.15**	**0.02**	ND	ND	ND	**0.02**	ND	**0.09**	ND	ND
Dibenzo(a,h)anthracene		ND	**0.02**	ND	ND	ND	ND	ND	ND	**0.02**	ND	ND
Fluoranthene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	ND	**0.07**	ND	ND	ND	ND	ND	ND	**0.06**	ND	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	**0.07**	**0.31**	ND	ND	ND	ND	**0.1**	ND	**0.22**	ND	ND
Pyrene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		0.17	1.1	0.08	0.02	0.02	0	0.22	0	0.78	0	

Notes:

ND - Not detected

J - The value is estimated. This flag is used: a) on form 1 when the compound is reported above the MDL, but below the PQL, and b) on the Tentatively Identified Compounds (TIC) form for all compounds identified.

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 30
431 Kent Avenue, Brooklyn, NY
ZONES A-D
Groundwater Analytical Results
Pesticides / PCBs
JANUARY 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
PCB-1016	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	**0.09**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDD	**0.3**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDE	**0.2**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDT	**0.11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-BHC	**0.94**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	**0.04**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	**0.05**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	**0.04**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	**0.004**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC	**0.05**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	**0.04**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	**0.03**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	**35**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
ND - Non-detect
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 31
431 Kent Avenue, Brooklyn, NY
ZONES A-D
Groundwater Analytical Results
Metals (Total)
JANUARY 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
Aluminum	NS	226,000	425,000	183,000	4,690	192,000	152,000	157,00	250,000	79,400	166,000	107,000	416,000
Antimony	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	25	63	52	54	BDL	600	51	43	76	55	38	37	107
Barium	1000	2,09	6,410	2,060	95	2,030	2,080	1,660	3,740	1,130	2,550	2,270	3,840
Beryllium	3	14	23	12	BDL	10	15	13	17	5	100	14	26
Cadmium	5	BDL	8	12	BDL	10	2	2	BDL	4	BDL	BDL	BDL
Calcium	NS	87,200	271,000	360,000	65,700	458,000	395,000	189,000	191,000	575,000	120,000	146,000	227,000
Chromium	50	426	1,190	702	12	423	752	559	1,090	332	648	319	861
Cobalt	NS	236	917	199	5	220	866	301	427	293	575	165	436
Copper	200	647	1,100	854	18	633	670	509	1,130	1,290	619	489	1,080
Iron	500	354,000	879,000	241,000	6,610	231,000	289,000	236,000	528,000	158,000	460,000	121,000	569,000
Lead	25	223	380	4,370	13	10,100	356	94	282	5,790	278	101	429
Magnesium	35000	103,000	182,000	68,700	16,300	118,000	71,600	71,500	144,000	64,800	73,500	67,400	197,000
Manganese	300	34,300	120,000	75,600	523	148,000	51,800	39,000	54,500	17,800	34,100	13,200	42,400
Mercury	0.7	BDL	2.9	0.9	BDL	6	0.6	BDL	BDL	1.5	0.3	BDL	0.4
Nickel	100	583	1,840	576	14	376	1,010	509	956	334	432	647	2,820
Potassium	NS	35.8	107,000	35,400	4,800	45,100	31,600	34,300	45,200	27,900	30,000	21,900	54,000
Selenium	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	50	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium	2000	145,000	99,800	73,100	72,100	101,000	94,400	103,000	108,000	83,500	81,100	56,200	75,000
Thallium	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium	NS	382	632	214	11	302	305	331	479,000	239	499	233	674
Zinc	2000	1,130	1,520	3,700	34	7,760	1,040	726	1,240	1,400	746	804	1,770

Notes:
ND - ND
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 32
431 Kent Avenue, Brooklyn, NY
ZONES A-D
Groundwater Analytical Results
Metals (Dissolved)
JANUARY 2012

Compound	NYSDEC Groundwater Quality Standards µg/L	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
Aluminum	**NS**	**230**	**390**	**960**	**20**	**320**	**100**	**150**	**280**	**110**	**830**	**430**	**240**
Antimony	**3**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	**25**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Barium	**1000**	**31**	**32**	**121**	**54**	**55**	**11**	**59**	**65**	**28**	**62**	**33**	**89**
Beryllium	**3**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium	**5**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Calcium	**NS**	**30,700**	**34,900**	**150,000**	**62,800**	**192,000**	**51,400**	**127,000**	**76,500**	**162,000**	**75,000**	**68,100**	**10,300**
Chromium	**50**	BDL	BDL	**2**	BDL	BDL	BDL	BDL	BDL	**2**	**4**	BDL	BDL
Cobalt	**NS**	BDL	**1**	**5**	BDL	**2**	BDL	**10**	**3**	BDL	**6**	BDL	**3**
Copper	**200**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Iron	**500**	**200**	**470**	**856**	BDL	**221**	**66**	**125**	**269**	**98**	**1,050**	**387**	**215**
Lead	**25**	BDL	BDL	0.008	BDL	**5**	BDL	BDL	BDL	**2**	**5**	BDL	BDL
Magnesium	**35000**	**7,190**	**11,100**	**25,700**	**14,300**	**56,800**	**5,790**	**31,400**	**15,900**	**31,200**	**73,500**	**26,200**	**21,300**
Manganese	**300**	**788**	**1,100**	**7,110**	**202**	**796**	**6**	**5,280**	**4,040**	**8**	**596**	**322**	**779**
Mercury	**0.7**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nickel	**100**	**6**	**5**	**11**	**3**	**4**	**3**	**22**	**14**	BDL	**6**	**10**	**25**
Potassium	**NS**	**3,200**	**5,800**	**15,200**	**4,700**	**13,300**	**7000**	**11,200**	**5,400**	**9,500**	**4,300**	**3,100**	**5,000**
Selenium	**10**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Silver	**50**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sodium	**2000**	**129,000**	**71,800**	**68,400**	**66,500**	**97,400**	**82,600**	**94,000**	**108,000**	**71,200**	**80,500**	**47,200**	**72,600**
Thallium	**0.5**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Vanadium	**NS**	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**3**	BDL	BDL
Zinc	**2000**	BDL	BDL	**4**	**5**	**9**	**3**	BDL	BDL	BDL	**3**	**3**	BDL

Notes:
ND - ND
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 33
431 Kent Avenue, Brooklyn, New York
Parameters Detected Above Ambient Groundwater Standards

Compound	Range in Exceedences	Frequency of Detection	Zone A GW1 µg/L	Zone A GW2 µg/L	Zone A GW3 µg/L	Zone B GW1 µg/L	Zone B GW2 µg/L	Zone B GW3 µg/L	Zone B GW4 µg/L	Zone C GW1 µg/L	Zone C GW2 µg/L	Zone C GW3 µg/L	Zone C GW4 µg/L	Zone D GW1 µg/L
VOCS														
1,2,4-Trimethylbenzene	11	1												
1,3,5-Trimethylbenzene	17	1												
Chloroform	7.8 - 19	11				9.8				8	8.8	13	9.8	
sec-Butylbenzene	6.6	1												
Tetrachloroethene	6.1 - 91	25	76	26	13			14	24	15	14	6.1	24	18
Trichloroethene	5.6 - 72	15				6.5	25	6.9		15	25	72	16	15
SVOCS														
Benzo(a)anthracene	0.02 - 9.6	17	0.11	0.35	9.6	0.08	0.29	0.32	0.04		2.7	0.33		0.03
Benzo(b)fluoranthene	0.02 - 9.7	14	0.13	0.44	9.7	0.1	0.4	0.39	0.05		3.3	0.44		0.02
Benzo(k)fluoranthene	0.04 - 3.6	11	0.04	0.18	3.6	0.04	0.11	0.14	0.05		1.1	0.14		
Bis(2-ethylhexyl)phthalate	6.1 - 7.9	3	6.1	7.9									6.7	
Chrysene	0.02 - 8.7	15	0.1	0.34	8.7	0.08	0.3	0.31	0.03		2.7	0.34		0.02
Indeno(1,2,3-cd)pyrene	0.04 - 5.1	10	0.06	0.18	5.1	0.04	0.18	0.15			1.8	0.21		
Metals														
Iron	856	1			856									
Magnesium	56,800 - 73,500	2					56,800					73,500		
Manganese	322 - 7,110	8	788	1,100	7,110				5,280	4,040		596	322	779
Sodium	47,200 - 129,000	12	129,000	71,800	68,400	66,500	97,400	82,600	94,000	108,000	71,200	80,500	47,200	72,600

Compound	Range in Exceedences	Frequency of Detection	MW1S µg/L	MW2S µg/L	MW3S µg/L	MW3D µg/L	MW4S µg/L	MW4D µg/L	MW5S µg/L	MW6S µg/L	MW6D µg/L	MW7S µg/L	MW7D µg/L	MW8S µg/L	MW9S µg/L	MW10S µg/L	MW11S µg/L
VOCS																	
1,2,4-Trimethylbenzene	11	1						11									
1,3,5-Trimethylbenzene	17	1						17									
Chloroform	7.8 - 19	11								16	7.9		8.0	19	7.8		17
sec-Butylbenzene	6.6	1						6.6									
Tetrachloroethene	6.1 - 91	25	91	9.8	13	44	11	20	11	64	63	18	48	29	18	7.2	43
Trichloroethene	5.6 - 72	15	6.9			6.5						6.1		5.6	16	15	24
SVOCS																	
Benzo(a)anthracene	0.02 - 9.6	17	0.06	0.15	0.04		0.02		0.02			0.04			0.11		
Benzo(b)fluoranthene	0.02 - 9.7	14		0.19	0.02							0.03			0.12		
Benzo(k)fluoranthene	0.04 - 3.6	11		0.07											0.05		
Bis(2-ethylhexyl)phthalate	6.1 - 7.9	3															
Chrysene	0.02 - 8.7	15	0.04	0.15	0.02							0.02			0.09		
Indeno(1,2,3-cd)pyrene	0.04 - 5.1	10		0.07											0.06		

Table 34
431 Kent Avenue, Brooklyn, NY
ZONES A-D
Air Analytical Results (Soil Gas)
JANUARY 2012

COMPOUNDS	NYSDOH Air Guidance Value (µg/m³) [a]	NYSDOH Soil Outdoor Background Levels (µg/m³) [b]	Zone A SG1 (µg/m³)	Zone A SG2 (µg/m³)	Zone A SG3 (µg/m³)	Zone B SG1 (µg/m³)	Zone B SG2 (µg/m³)	Zone B SG3 (µg/m³)	Zone C SG1 (µg/m³)	Zone C SG2 (µg/m³)	Zone C SG3 (µg/m³)	Zone D SG1 (µg/m³)	Zone D SG2 (µg/m³)	Zone D SG3 (µg/m³)
1,1,1,2-Tetrachloroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	100	<2.0 - 2.8	ND	ND	1.8	ND	10.4	7.85	6.71	8.67	10.4	16.1	17.8	5.83
1,1,2,2-Tetrachloroethane		<1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene		<1.0	1.23	ND	1.08	3.65	1.33	1.13	1.33	1.47	1.33	1.18	1.23	1.18
1,2-Dibromoethane		<1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene		<2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene		<1.0	ND	ND	ND	1.42	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Butadiene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene		<2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone			1.27	ND	1.06	1.92	2.05	1.64	2.01	1.88	1.68	1.8	1.31	2.05
Acetone		NA	35.6	16.5	75.7	31.8	20.3	29.4	95.9	60.8	106	188	212	69.6
Acrylonitrile			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene		<1.6 - 4.7	2.04	1.21	1.28	1.53	1.72	2.08	1.63	1.6	5.24	1.5	1.82	1.88
Benzyl Chloride		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane		<5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.14
Bromomethane		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide		NA	8.28	ND	2.77	1.31	17.8	3.33	ND	ND	55.7	ND	2.64	4.14
Carbon Tetrachloride	50	<3.1	0.377	0.377	0.377	1.51	0.692	0.44	1.13	1.07	0.817	0.692	1.76	0.629
Chlorobenzene		<2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform		<2.4	2.73	6.54	ND	56.6	9.27	13.8	89.8	46.9	35.7	33	102	41.2
Chloromethane		<1.0 - 1.4	ND	ND	ND	13.4	ND	ND	ND	ND	ND	4.11	5.32	ND
cis-1,2-Dichloroethene		<1.0	ND	ND	ND	9.03	ND	ND	38.4	11.8	ND	20.2	14.6	1.27
cis-1,3-Dichloropropene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane		NA	1.07	ND	ND	ND	1.2	ND	0.998	ND	ND	ND	1.31	1.24
Dibromochloromethane		<5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluromethane		NA	2.22	1.19	2.22	3.21	3.26	2.87	3.16	2.82	4.05	2.47	2.67	2.47
Ethanol			E 657	E 444	E 506	416	552	497	804	576	554	740	518	589
Ethyl Acetate		NA	1.44	1.26	1.19	1.58	1.84	1.3	1.8	1.94	ND	ND	2.27	2.23
Ethylbenzene		<4.3	ND	ND	ND	1.17	1.22	ND	1.04	1.26	1.13	1.08	1.26	1.17
Heptane		NA	ND	ND	ND	ND	2.78	ND	ND	ND	10.3	ND	ND	1.23
Hexachlorobutadiene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane		<1.5	3.14	1.34	1.16	ND	11.4	2.29	ND	2.64	68	2.29	3.45	3.91
Isopropylalcohol		NA	ND	ND	6.51	ND	ND	18.2	ND	ND	ND	ND	ND	ND
Isopropylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (m&p)		<4.3	2.69	2.17	2.21	3.56	3.69	2.6	2.95	3.69	3.21	3.17	3.21	3.38
Methyl Ethyl Ketone			2.65	1.8	1.83	2.62	2.15	1.68	2.15	2.03	ND	2.03	2.71	3.48
MTBE		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride		<3.4	3.58	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene			ND	ND	ND	1.26	1.54	ND	ND	ND	ND	1.48	ND	ND
Xylene (o)		<4.3	1.08	ND	ND	1.3	1.34	1.08	1.13	1.39	1.17	1.22	1.26	1.34
Propylene		NA	139	3.11	2.87	4.56	11.1	16.4	10.2	5.18	121	9.49	15.4	27.9
sec-Butylbenzene			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene		<1.0	ND	ND	ND	1.28	1.4	ND	1.62	2	1.49	1.96	2.13	1.49
Tetrachloroethylene	100		2.51	1.15	5.96	2.44	4.27	7.32	3.05	8.2	30.4	2.3	2.3	4.13
Tetrahydrofuran		NA	4.24	3.48	3.65	4.57	6.13	3.06	3.71	5.25	5.69	5.04	3.89	5.75
Toluene		1.0 - 6.1	7.42	7.19	6.97	11.3	11.8	9.19	11.7	12.4	13.4	11.1	14	13.1
trans-1,2-Dichloroethene		NA	ND	ND	ND	ND	ND	ND	2.85	ND	ND	8.72	1.58	ND
trans-1,3-Dichloropropene		NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	50	<1.7	3.33	6.77	3.11	612	526	763	773	1,060	513	130	213	217
Trichlorofluoromethane		NA	1.68	1.8	1.4	2.08	3.7	6.51	2.81	4.66	19.4	4.83	4.6	3.76
Trichlorotrifluoroethane			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PVOCs			162	15	23	33	10	4	39	42	226	34	45	57
Total CVOCs			13	11	10	623	530	770	824	1,089	554	169	248	228
Total VOCs			885	499.9	629.1	1,191	1,210.4	1,392.2	1,863	1,823.7	1,563.1	1,194	1,153.5	1,011.5

Notes:

NA No guidance value or standard available

E - Estimated value quantitated above calibration range for this compound.

(a) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006. New York State Department of Health.

(b) NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, February 2005, Summary of Background Levels for Selected Compounds (NYSDOH Database, Outdoor values)

Value detected above NYSDOH Air Guidance Value of 100 µg/m3, which according to Soil Vapor/Indoor Air Matrix 2 would require at a minimum, monitoring.

TABLE 35
431 Kent Avenue, Brooklyn, New York
Air Analytical Reults (Soil Gas, Indoor / Outdoor Air)
Volatile Organic Compounds
JUNE 2012

COMPOUNDS	NYSDOH Maximum Sub-Slab Value (µg/m³) [a]	NYSDOH Maximum Indoor Air Value (µg/m³) [a]	NYSDOH Soil Outdoor Background Levels (µg/m³) [b]	PSG1 (µg/m³)	PSG2 (µg/m³)	PSG3 (µg/m³)	PSG4 (µg/m³)	PSG5 (µg/m³)	PSG6 (µg/m³)	PSG7 (µg/m³)	PSG8 (µg/m³)	PSG9 (µg/m³)	PSG10 (µg/m³)	PSG11 (µg/m³)	PSG12 (µg/m³)	IA1 (µg/m³)	IA2 (µg/m³)	IA3 (µg/m³)	IA4 (µg/m³)	OA1 (µg/m³)
1,1,1,2-Tetrachloroethane				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	100		<2.0 - 2.8	ND	**2.78**	**9.6**	**30**	**50.8**	**5.18**	**4.91**	**11.9**	**14.3**	**3.16**	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane			<1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene			<1.0	**3.39**	**2.8**	**2.46**	**3.19**	**3.14**	**2.65**	**2.41**	**1.92**	**3.24**	**1.42**	**2.06**	**2.36**	ND	ND	ND	ND	ND
1,2-Dibromoethane			<1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene			<2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Butadiene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene			<2.0	**2.4**	ND	**1.44**	**2.28**	ND	**4.14**	**1.02**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5.6**	ND	ND	ND
4-Methyl-2-pentanone				**13.4**	**15.9**	**18.6**	**20**	**20.2**	**15.3**	**17.8**	**14.9**	**18.9**	**18**	**13.4**	**17.2**	ND	ND	**1.1**	ND	ND
Acetone			NA	**32.3**	**34.2**	**57.2**	**234**	**22.6**	**134**	**31.3**	**76.2**	**73.1**	**39.4**	**32.3**	**31.6**	**18.6**	ND	**25.4**	**12.2**	**7.36**
Acrylonitrile				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene			<1.6 - 4.7	**17.6**	**1.4**	**1.18**	**1.56**	**1.05**	**1.53**	ND	**4.09**	**2.9**	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl Chloride			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane			<5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide			NA	**5.16**	**1.99**	**1.28**	**3.33**	**5.13**	**3.55**	**1.12**	**1.56**	**5.01**	**13.9**	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	50		<3.1	**0.44**	**2.01**	**2.58**	**1.63**	**1.95**	**0.377**	**0.754**	**0.88**	**1**	**0.566**	**0.44**	**0.503**	**0.629**	**0.629**	**0.629**	**0.629**	**0.629**
Chlorobenzene			<2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform			<2.4	ND	**31.9**	**182**	**170**	**154**	**22.5**	**40.1**	**40**	**27.8**	**42.4**	**1.56**	**4.05**	ND	ND	ND	ND	ND
Chloromethane			<1.0 - 1.4	ND	ND	ND	ND	**4.48**	ND	ND	ND	ND	ND	ND	ND	**1.16**	**1.05**	**1.73**	**1.2**	**1.16**
cis-1,2-Dichloroethene			<1.0	ND	**3.21**	**33.1**	**35.9**	**25.9**	ND	ND	**8.96**	**2.18**	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane			NA	ND	ND	ND	ND	ND	ND	ND	**1.93**	ND	**3.34**	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane			<5.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluromethane			NA	**2.87**	**3.16**	**3.9**	**3.76**	**2.67**	**2.72**	**2.82**	**3.76**	**3.36**	**2.96**	**2.96**	**3.06**	**2.82**	**2.72**	**2.47**	**2.77**	**2.96**
Ethanol				**45.9**	**73.8**	E **106**	**96.4**	**59.1**	**50.8**	**56.7**	**57.8**	**105**	**67.8**	**65**	**53.1**	E **476**	E **163**	E **3,820**	**32.6**	**7.08**
Ethyl Acetate			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.63**	ND	**2.38**	ND	ND
Ethylbenzene			<4.3	**1.6**	**1.52**	ND	**1.26**	**1.22**	**1.52**	**1.04**	**1.17**	**1.52**	**1.17**	ND	**1.13**	ND	ND	ND	ND	ND
Heptane			NA	**3.89**	**1.1**	ND	**2.5**	**1.47**	**3.19**	**1.27**	**1.96**	**1.64**	**5.49**	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexane			<1.5	**2.99**	**2.4**	**2.75**	**6.3**	**3.56**	**1.41**	**1.02**	**1.41**	**2.78**	**5.92**	**5.42**	ND	**3.1**	**1.58**	ND	**14.3**	**1.27**
Isopropylalcohol			NA	**9.41**	**8.94**	ND	ND	ND	**8.55**	**8.72**	**11.8**	**34.6**	**10.2**	**8.87**	**9.26**	ND	ND	ND	**5.92**	ND
Isopropylbenzene				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (m&p)			<4.3	**3.56**	**3.12**	**2.17**	**2.52**	**2.56**	**3.25**	**2.26**	**2.56**	**3.17**	**2.43**	**2.04**	**2.56**	ND	ND	ND	ND	ND
Methyl Ethyl Ketone				**3.3**	**3.42**	**3.15**	**9.22**	**3.09**	**5.95**	**3.04**	**4.45**	**5.3**	**4.13**	**2.95**	**3.18**	**1.77**	**1.47**	ND	**1.83**	ND
MTBE			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride		60	<3.4	**1.14**	ND	**1.04**	ND	**1.04**	ND	**2.26**	**2.43**	**1.01**	**1.25**	**10.8**	**1.22**	**1.04**	**1.28**	**1.04**	**8.57**	**1.25**
n-Butylbenzene				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (o)			<4.3	**1.39**	**1.34**	**0.998**	**1.26**	**1.13**	**1.34**	ND	**1.17**	**1.39**	**0.998**	ND	**1.13**	ND	ND	ND	ND	ND
Propylene			NA	**3.22**	ND	ND	**66.2**	ND	ND	ND	ND	ND	**15.5**	ND	ND	**2.82**	ND	ND	ND	ND
sec-Butylbenzene				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene			<1.0	ND	ND	**1.02**	ND	**1.19**	ND	ND	ND	**1.02**	ND	ND	ND	**4.26**	**5.58**	**2.89**	ND	ND
Tetrachloroethene	100	100		**34.2**	**4.47**	**14.4**	**29.1**	**18.5**	**8.95**	**281**	**18,700**	**3,710**	**281**	**251**	**52.4**	**0.881**	**0.746**	**1.36**	**0.61**	**0.678**
Tetrahydrofuran			NA	**2.39**	**2.83**	**2.98**	**3.01**	**2.8**	**2.77**	**3.06**	**2.53**	**3.3**	**3.09**	**2.71**	**2.77**	ND	ND	ND	ND	ND
Toluene			1.0 - 6.1	**29.2**	**6.25**	**6.85**	**3.88**	**7.57**	**26.5**	**18**	**19.2**	**4.9**	**15.8**	**4.26**	**4.74**	**8.06**	**2.11**	ND	**4.71**	**1.02**
trans-1,2-Dichloroethene			NA	ND	ND	**1.94**	**12.7**	**4.24**	ND	ND	**2.93**	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene			NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	50	5	<1.7	**7.84**	**994**	**2,660**	**2,510**	**2,170**	**215**	**292**	**380**	**1,920**	**15**	**5.1**	**23.3**	ND	ND	ND	ND	**0.268**
Trichlorofluoromethane			NA	**2.19**	**2.58**	**3.26**	**3.7**	**5.22**	**4.55**	**6.79**	**41**	**10.6**	**2.13**	**1.85**	**1.63**	**1.57**	ND	**1.4**	**1.46**	**1.46**
Trichlorotrifluoroethane				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride			<1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PVOCs				95	51	42	121	49	74	59	69	85	87	42	44	23	16	6	27	2
Total CVOCs				42	1002	2708	2575	2214	224	573	19089	3857	296	256	76	1	1	1	1	1
Total VOCs				197	1171	3063	3020	2552	392	748	19320	5885	518	380	184	507	186	3835	75	18

Notes:
NA No guidance value or standard available

(a) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006. New York State Department of Health.
(b) NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, February 2005, Summary of Background Levels for Selected Compounds (NYSDOH Database, Outdoor values)
Value detected above NYSDOH Air Guidance Value of 50 µg/m3, which according to Soil Vapor/Indoor Air Matrix 1 would require at a minimum, monitoring.
Value detected above NYSDOH Air Guidance Value of 100 µg/m3, which according to Soil Vapor/Indoor Air Matrix 2 would require at a minimum, monitoring.
Value detected above NYSDOH Indoor Air Guidance Value

TABLE 36

Project Permit Listing

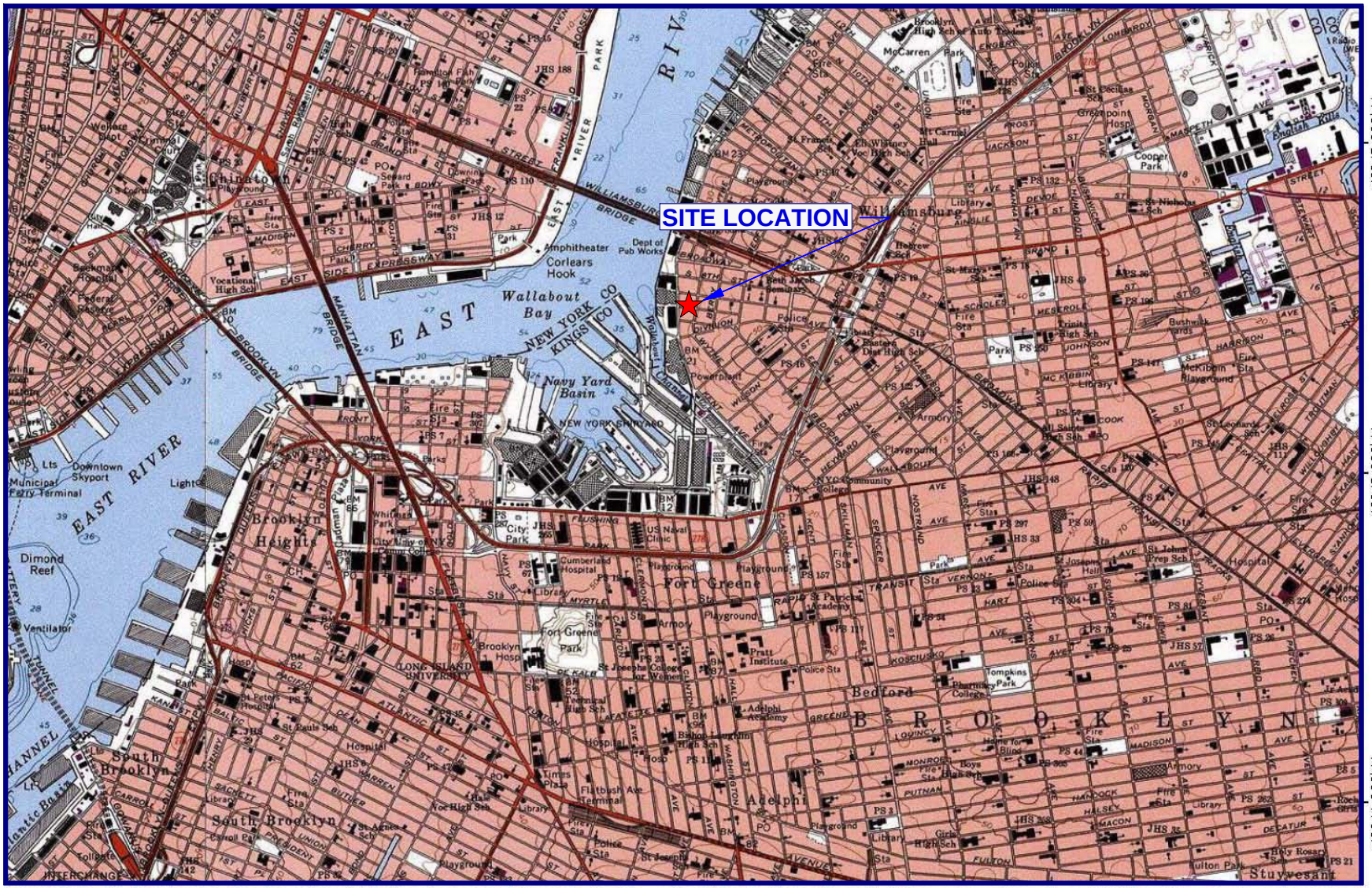
To Be Updated as Project Progresses

Permit	*Permit Number*	*Originating Agency*	*Pursuant to*	*Issued*	*Expires*	*Contact Phone*
No Permits Issued as of July 2012						

Table 37
Emergency Contact List

General Emergencies	911
NYC Police	911
NYC Fire Department	911
Woodhull Medical Center	(718) 963-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4897
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
EBC Project Manager	1-631-504-6000
EBC BCP Program Manager	1-631-504-6000
EBC Site Safety Officer	1-631-504-6000
Construction Manager	1-917-676-1087

FIGURES



USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

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FORMER DOMSEY FIBER CORP SITE
431 KENT AVENUE, BROOKLYN, NY

FIGURE 1 SITE LOCATION MAP

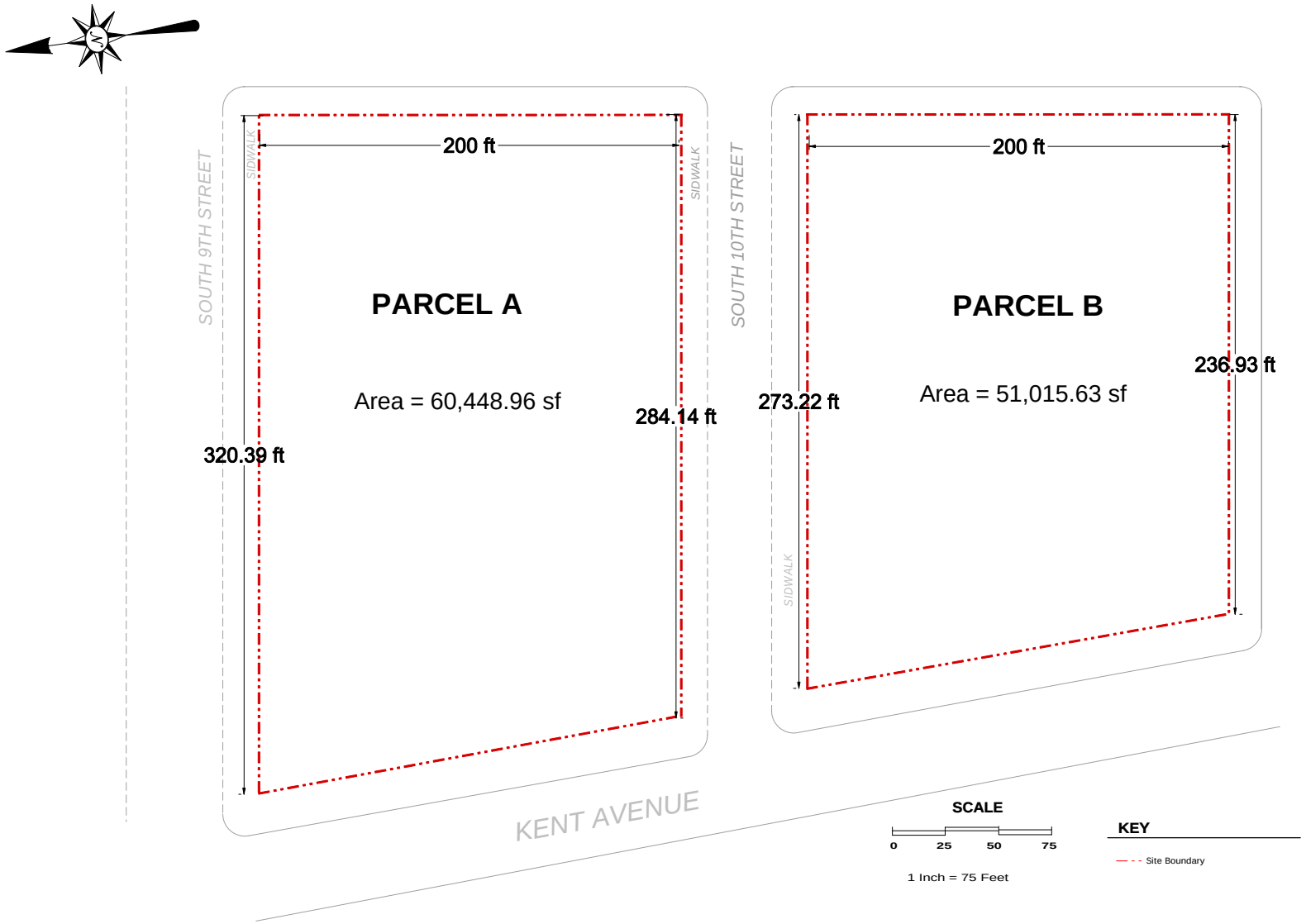

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FIGURE 2 Site Boundaries

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431 Kent Avenue
Brooklyn, NY 11211

FIGURE 3 Project Site and Adjacent Properties

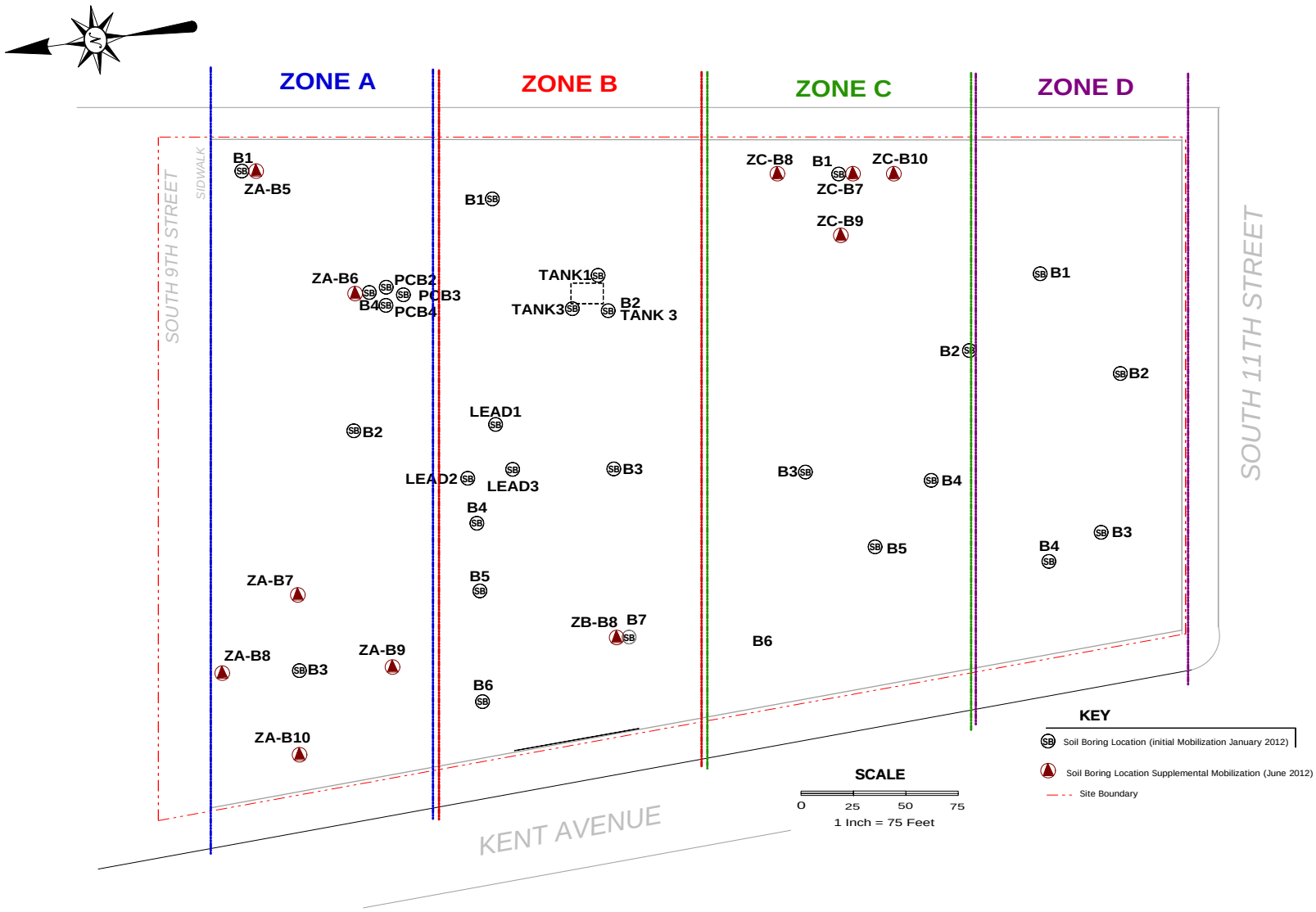

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FIGURE 4 Soil Boring Locations

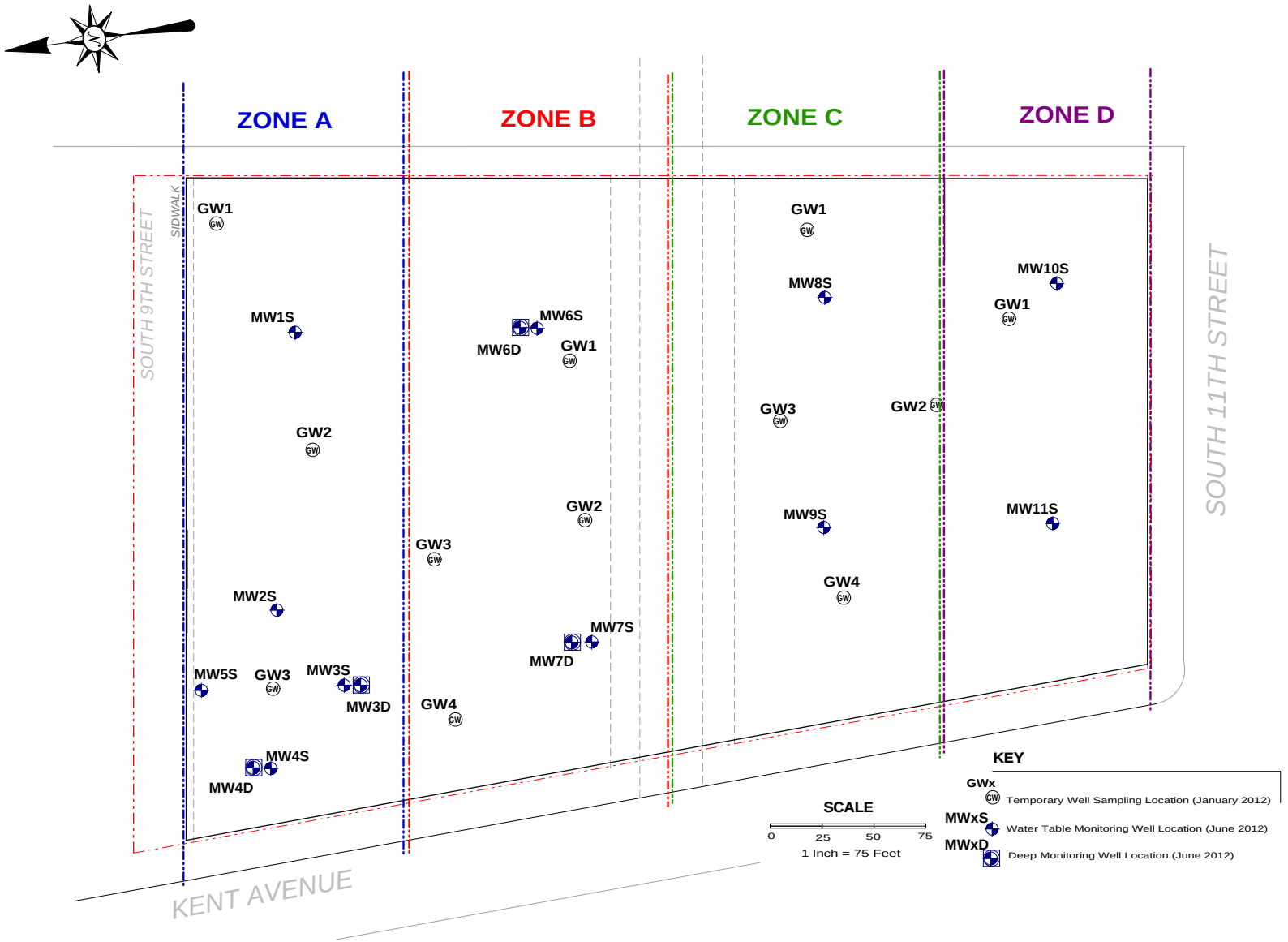

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FIGURE 5
MONITORING WELL LOCATIONS

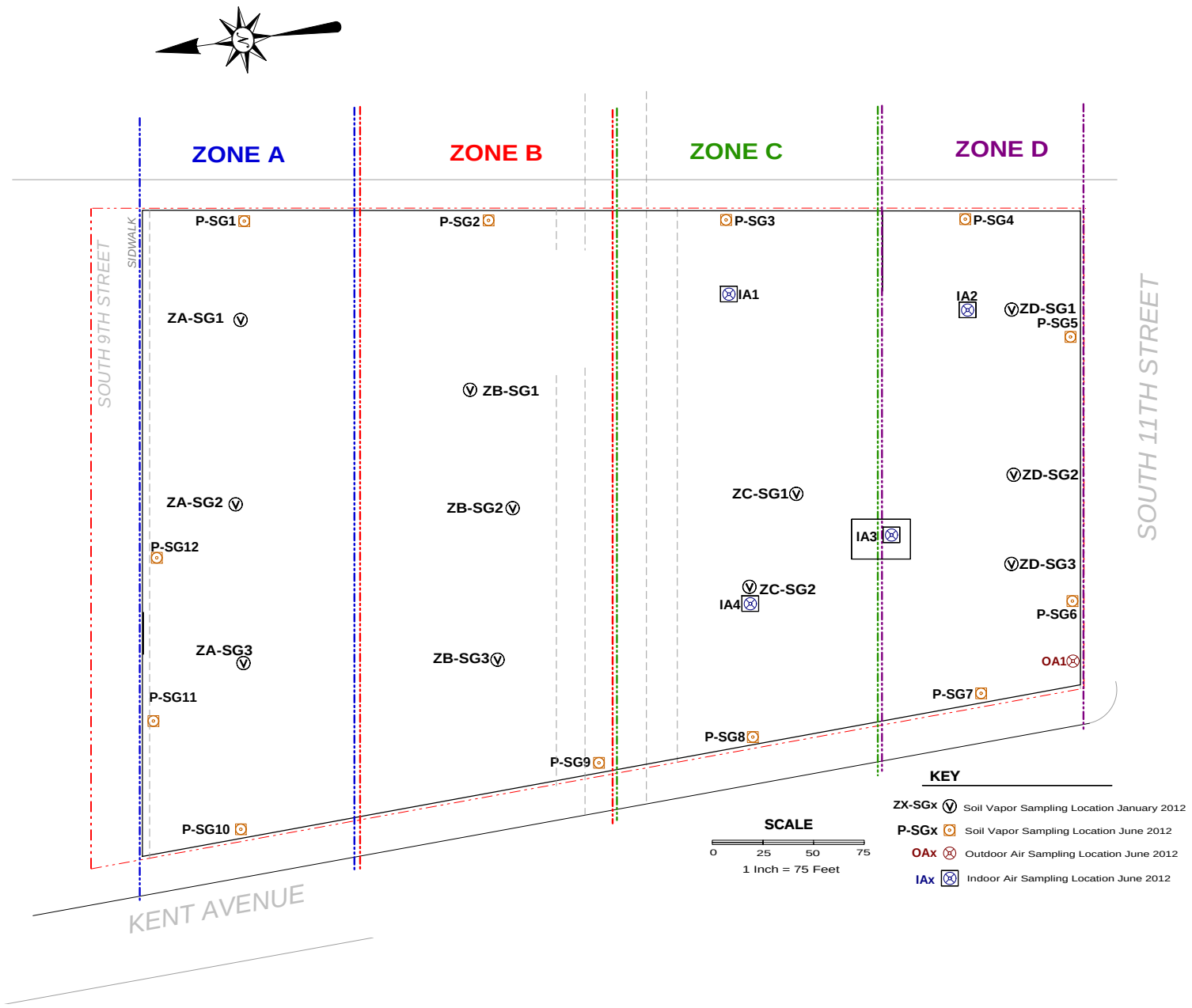

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FIGURE 6 SOIL GAS, INDOOR AIR & OUTDOOR AIR LOCATIONS

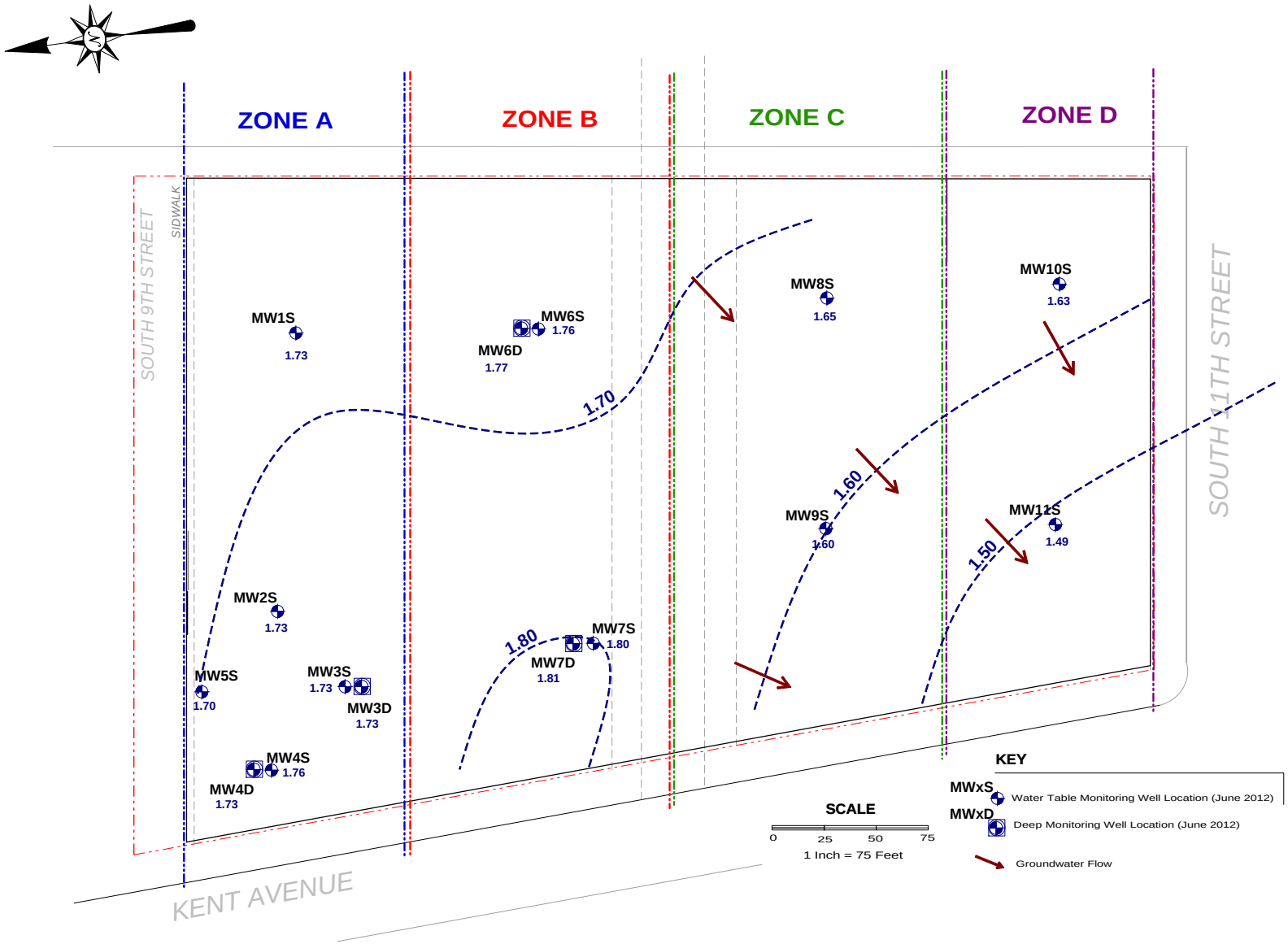

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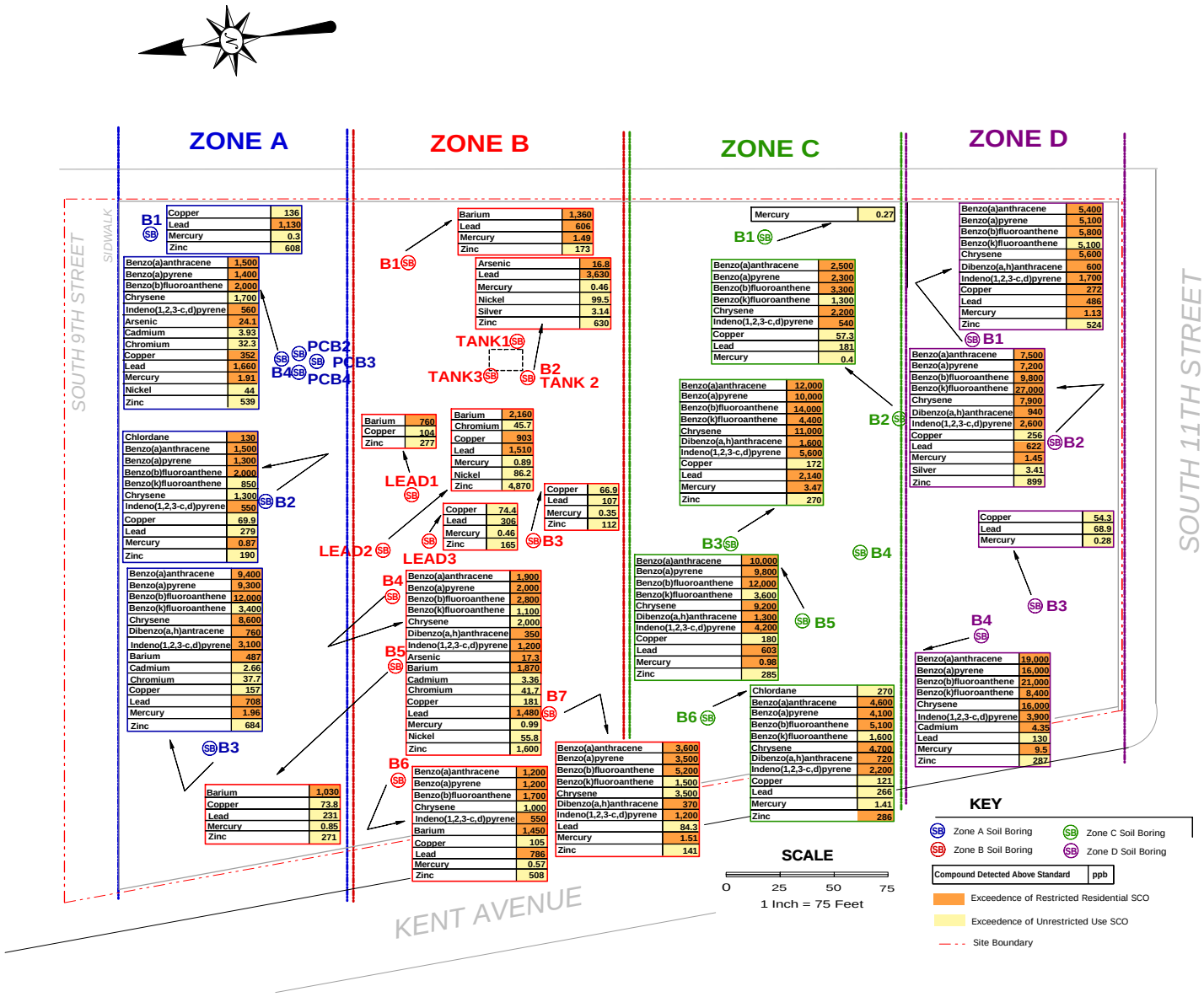
FIGURE 7
Groundwater Elevation Map



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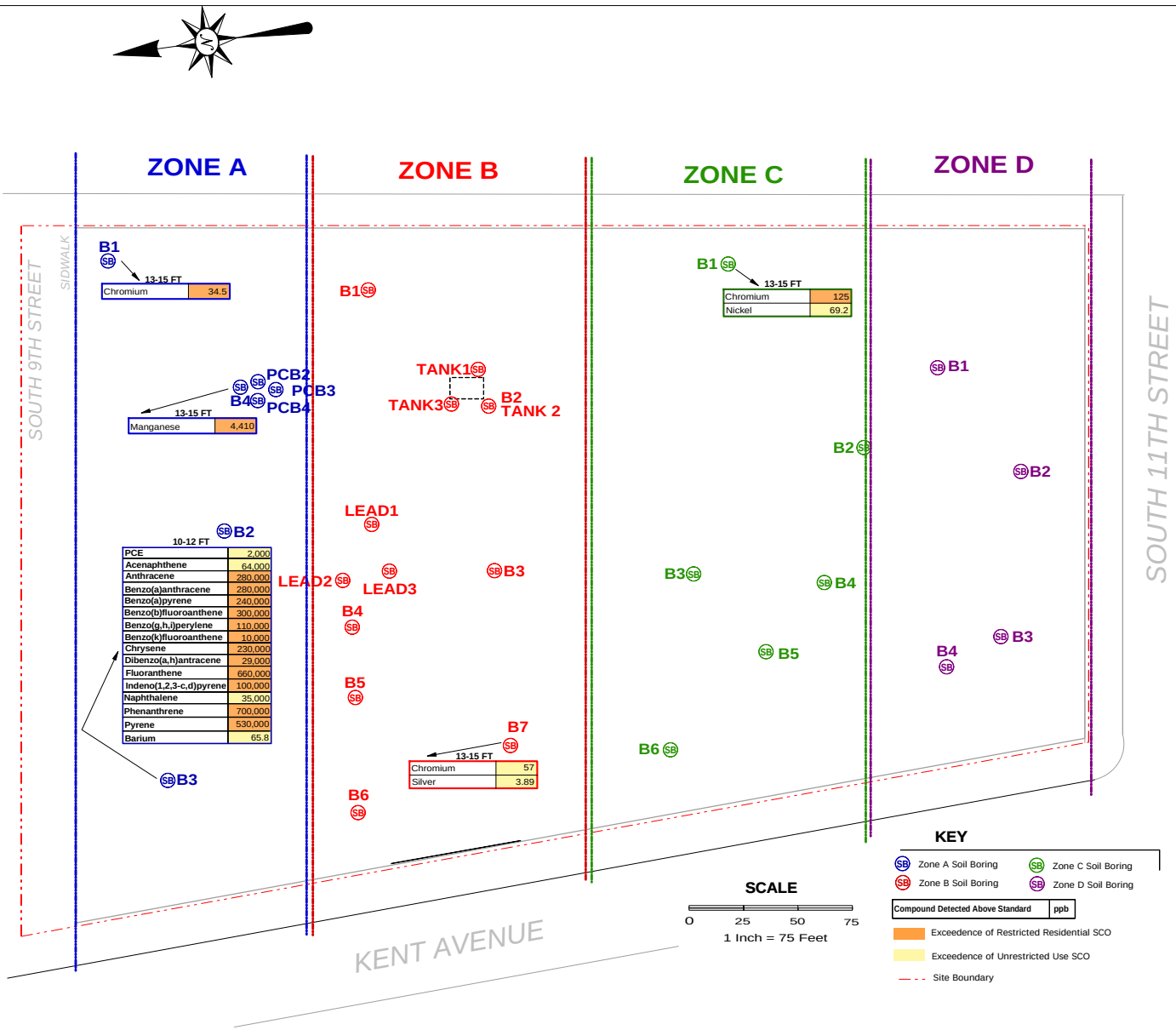
1/13/2012 - 1/22/2012

FIGURE 8 Shallow Soil Results (0-2 ft) Above Soil Cleanup Objectives



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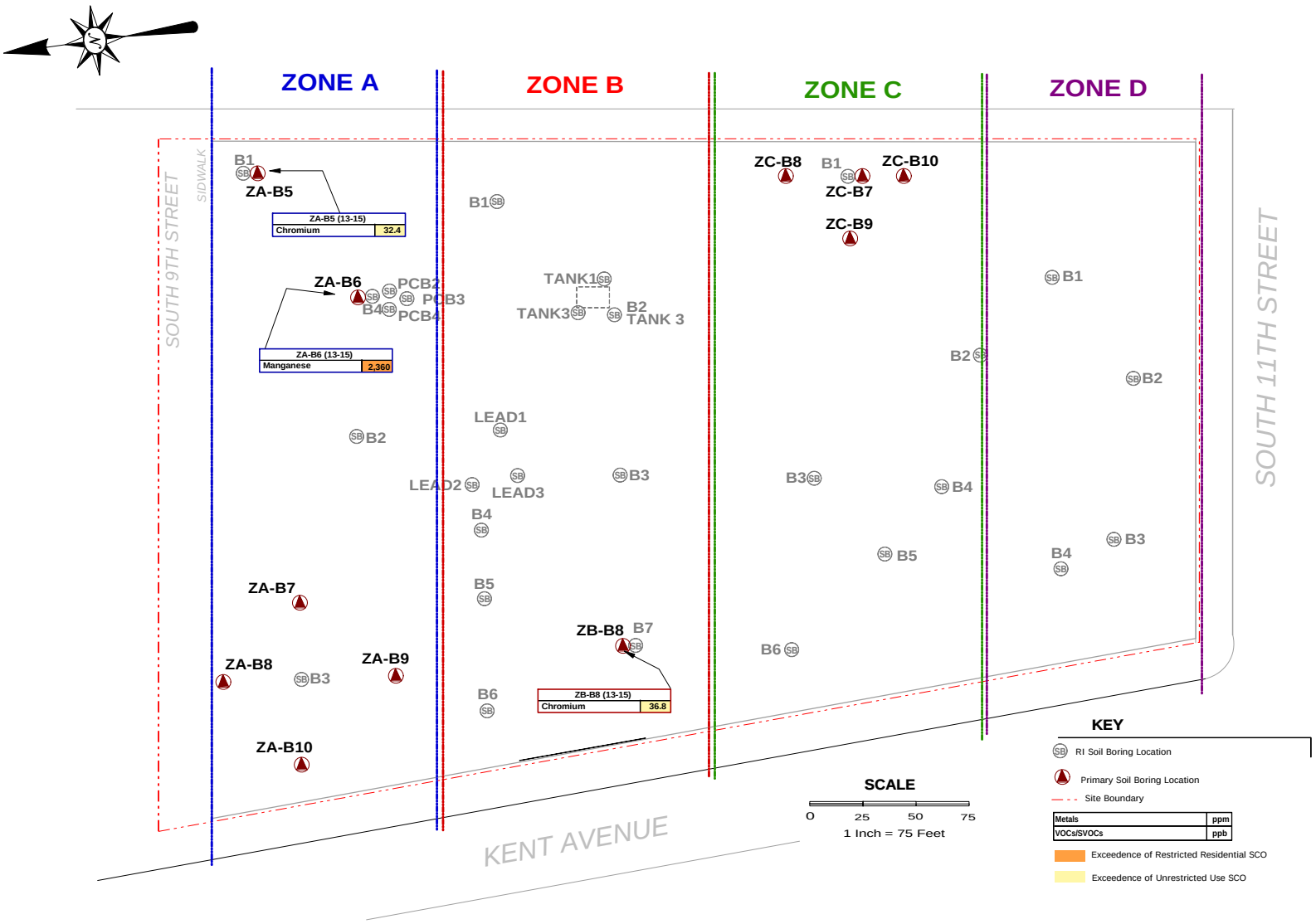
1/13/2012 - 1/22/2012

FIGURE 9 Deep Soil Results (10-15') Above Soil Cleanup Objectives



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6/21/2012 - 6/26/2012

FIGURE 10 Soil Results Above Soil Cleanup Objectives

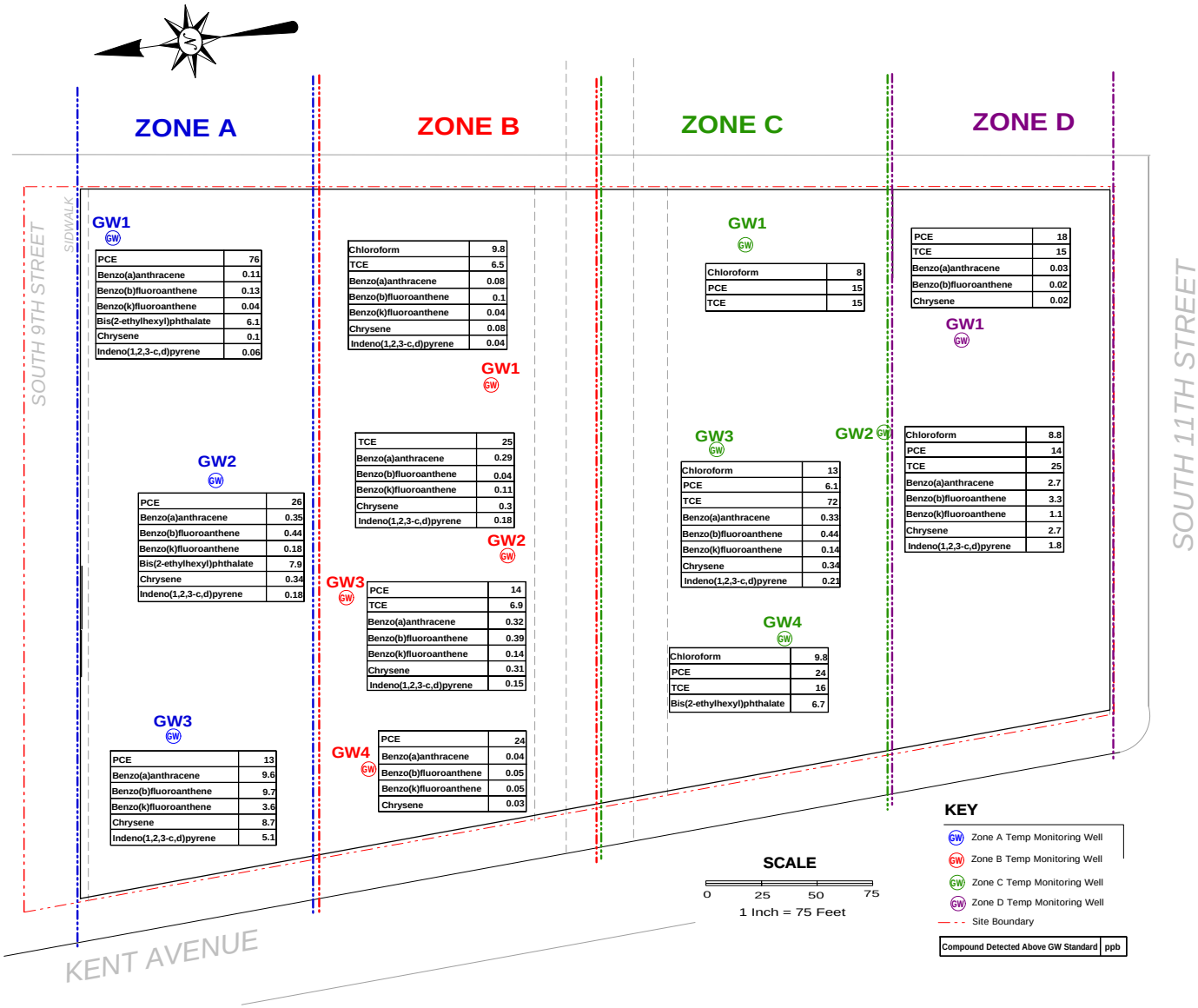

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FIGURE 11 RESULTS ABOVE GROUNDWATER STANDARDS

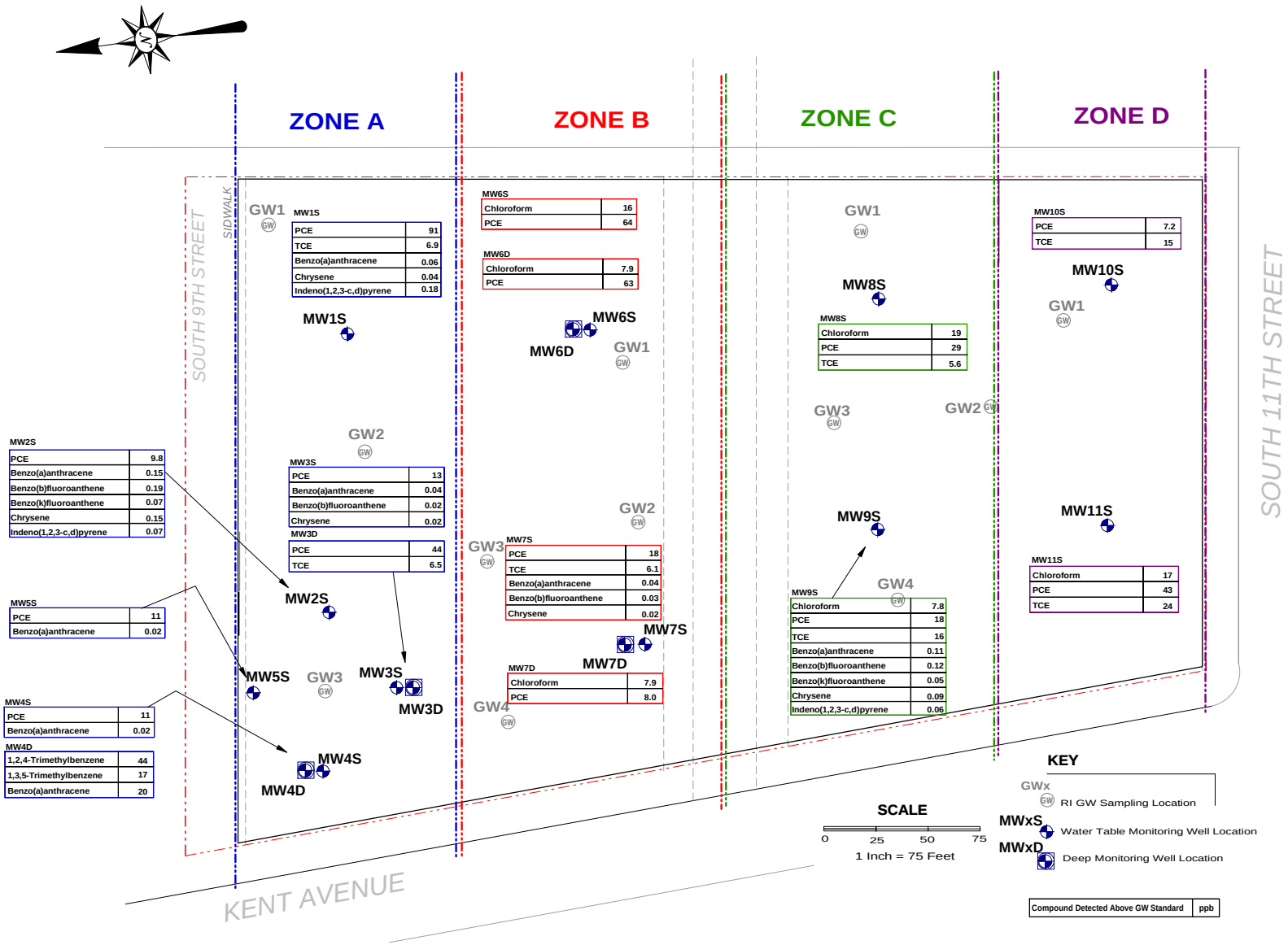

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FIGURE 12 SUPPLEMENTAL RESULTS ABOVE GROUNDWATER STANDARDS

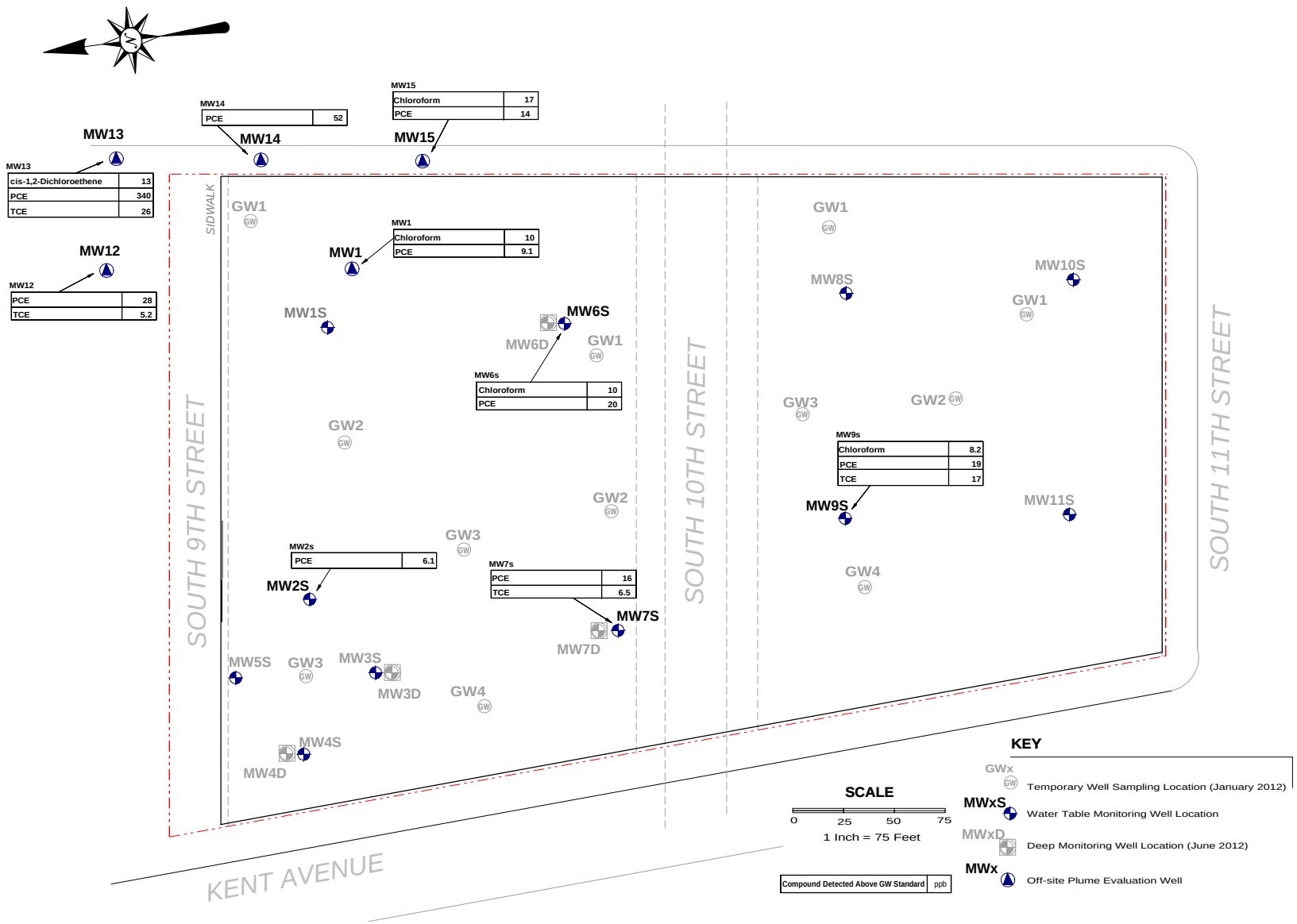

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FIGURE 13 SUPPLEMENTAL GROUNDWATER RESULTS ABOVE STANDARDS

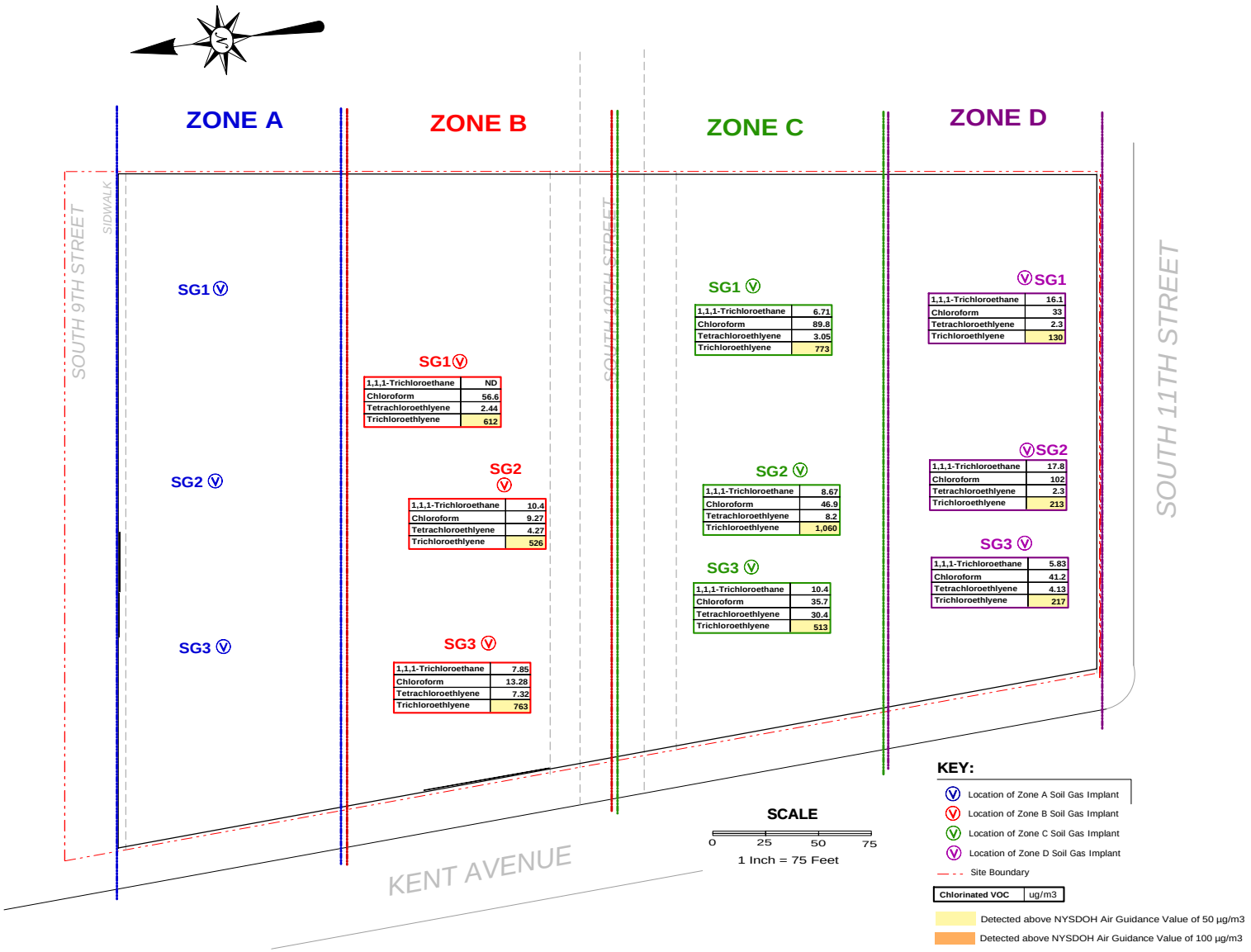

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FIGURE 14 SOIL GAS RESULTS

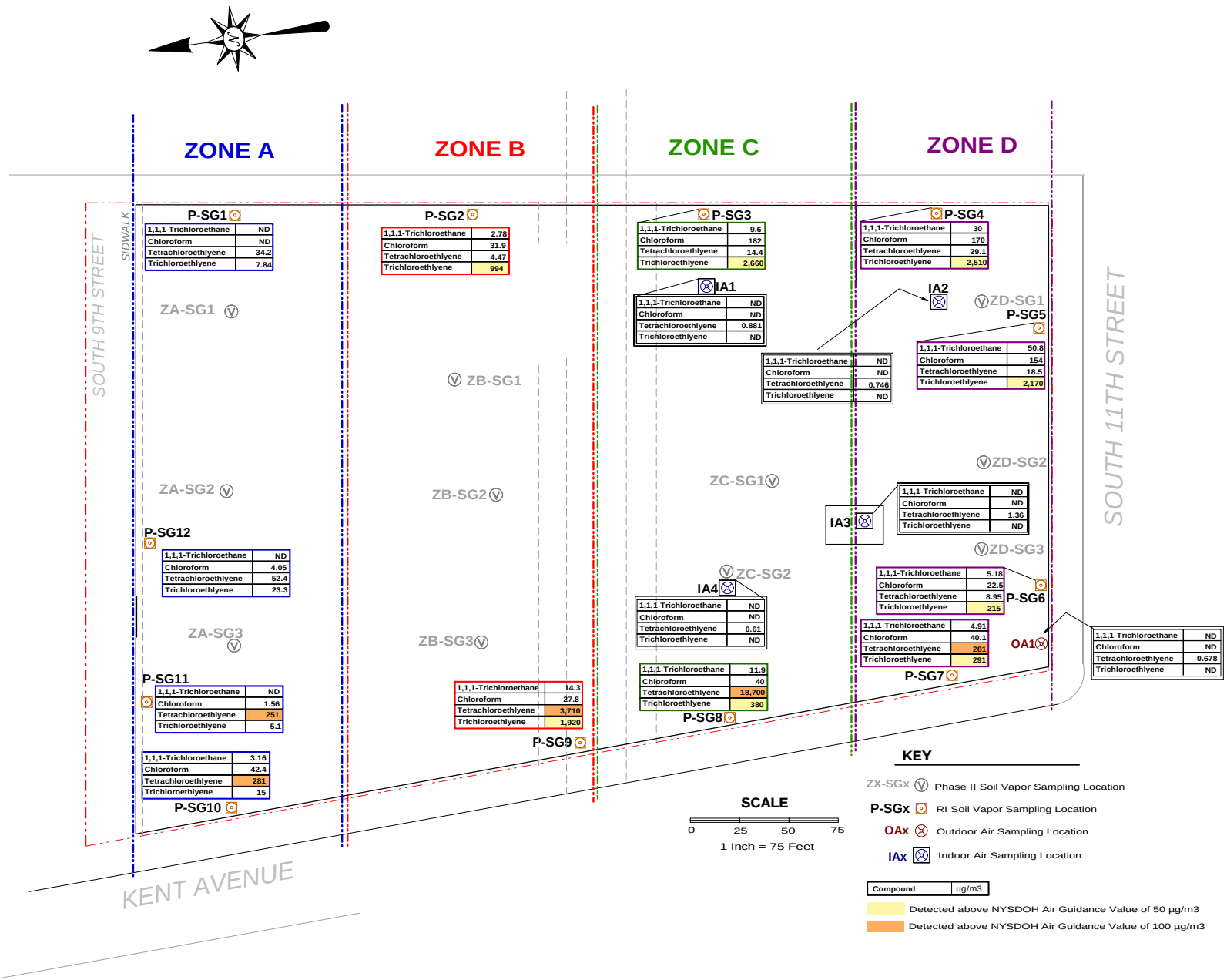

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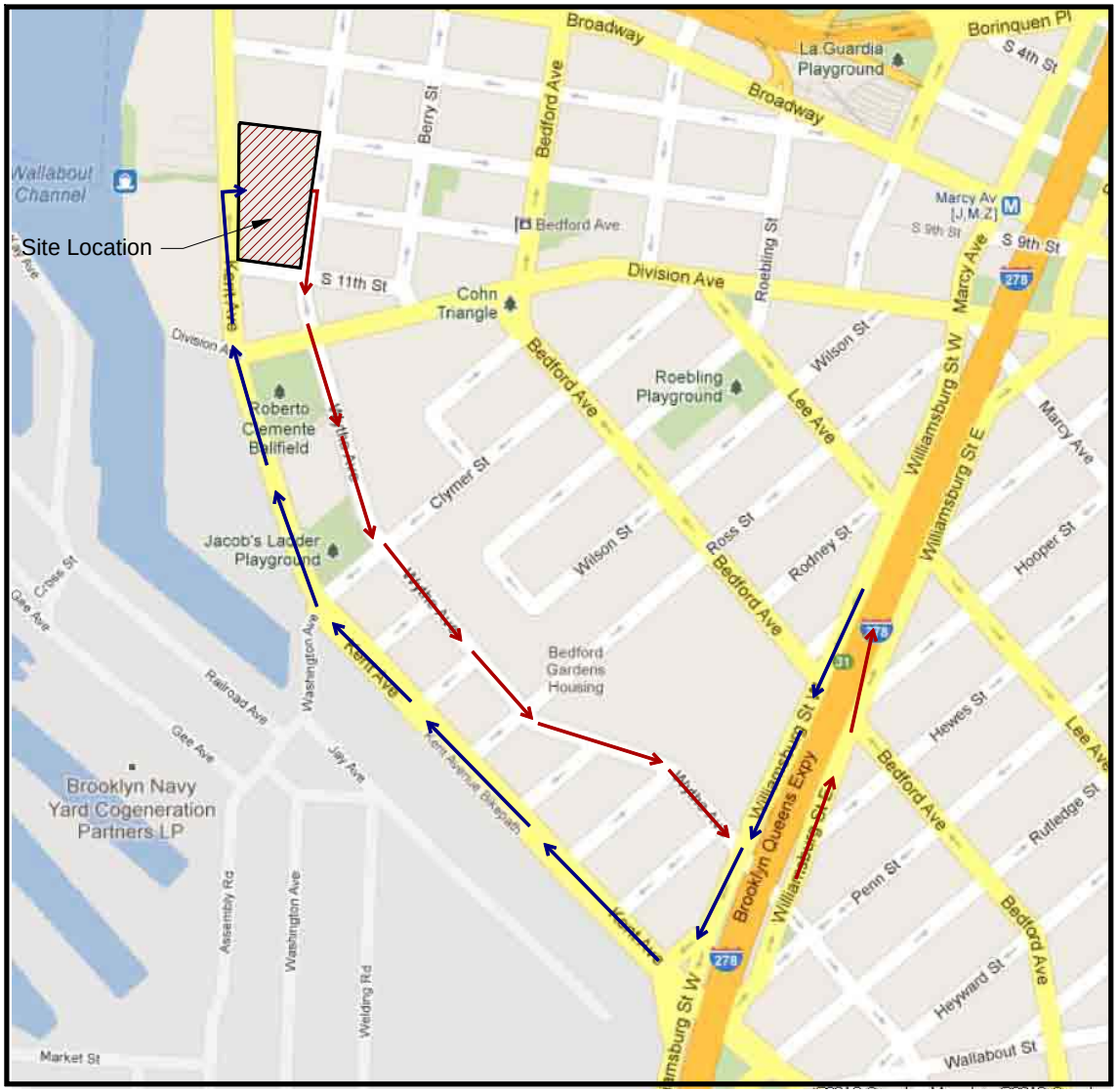
FIGURE 15 SOIL GAS AND INDOOR AIR RESULTS



Key

Truck Route to the Site

Truck Route from the Site

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FIGURE 16 TRUCK ROUTES

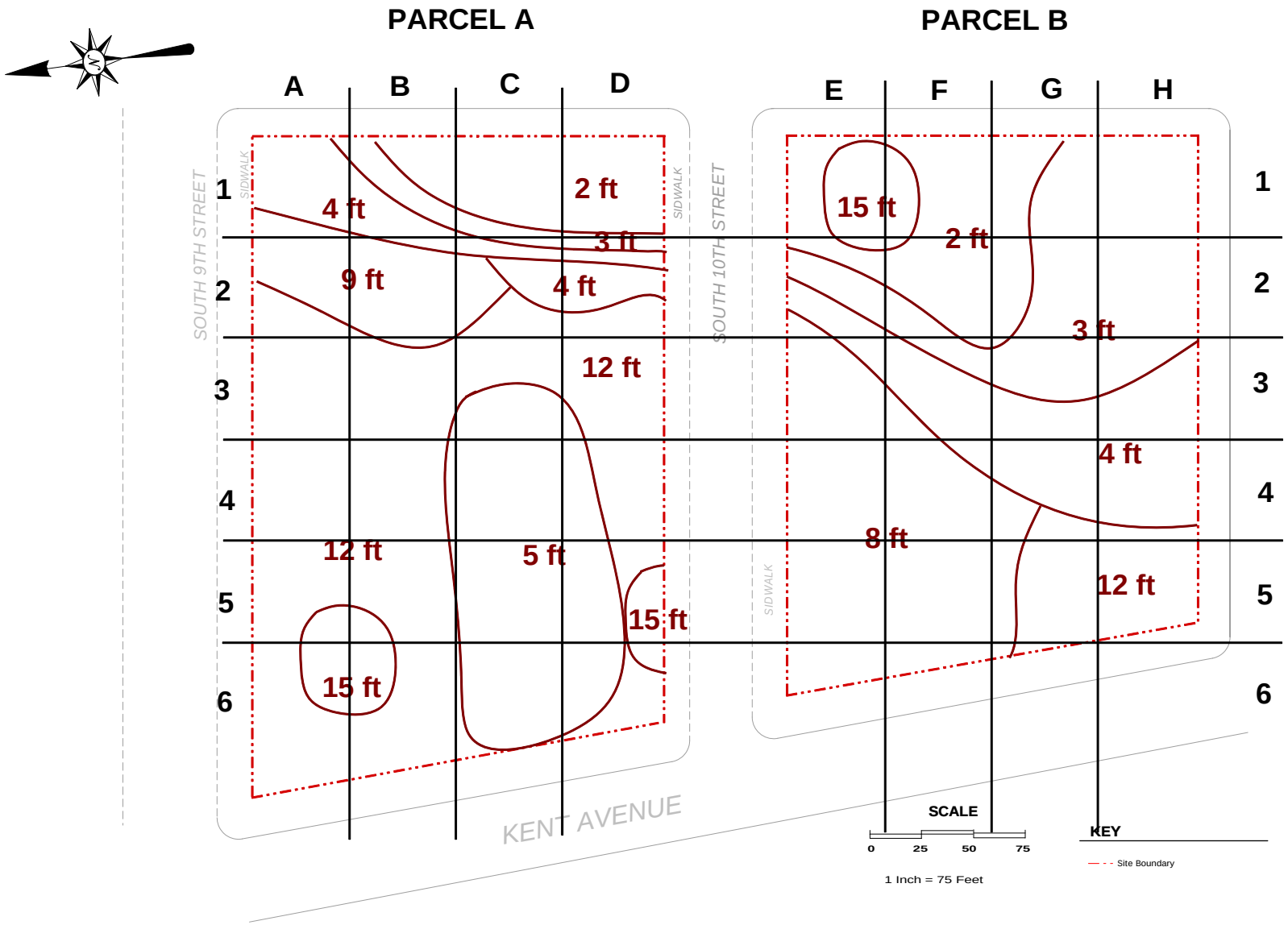

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FIGURE 17

Remedial Excavation Plan
Grid Map

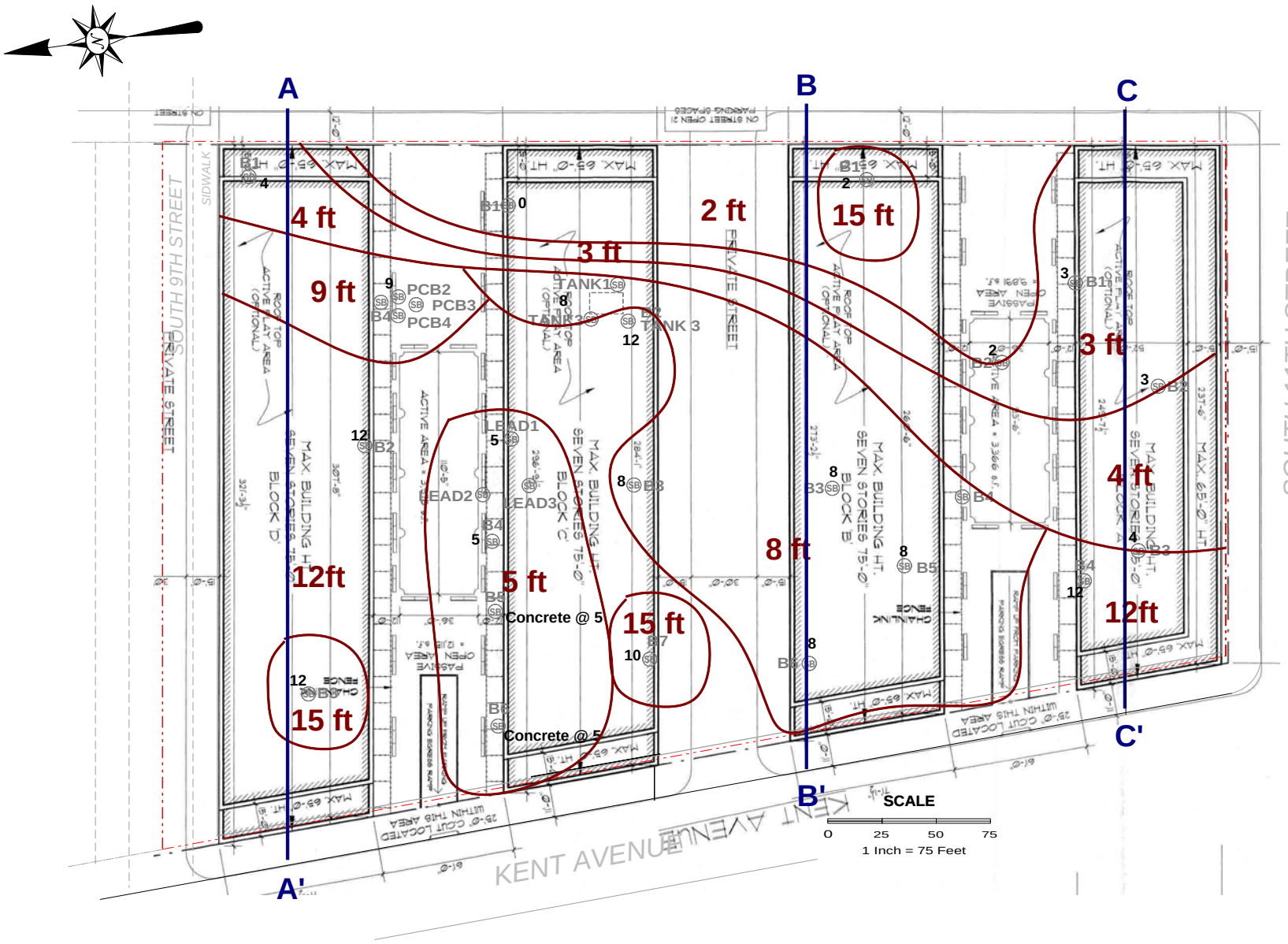

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FIGURE 18 Depth of Fill Materials

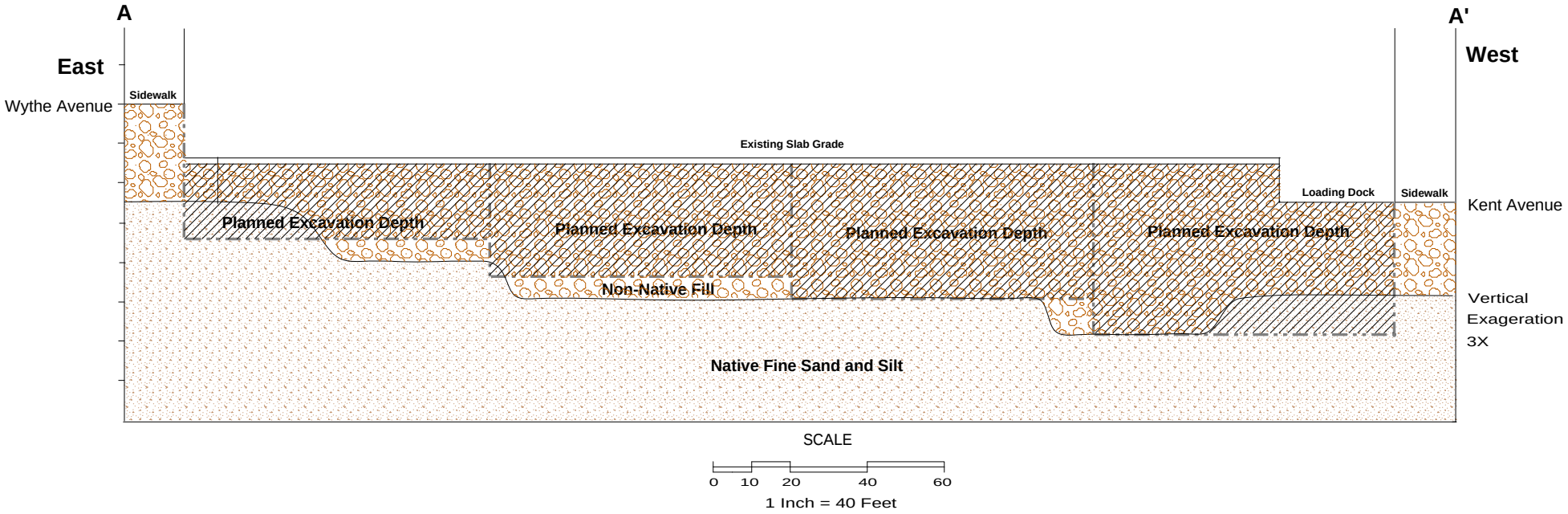

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FIGURE 19 Cross-Section A-A'

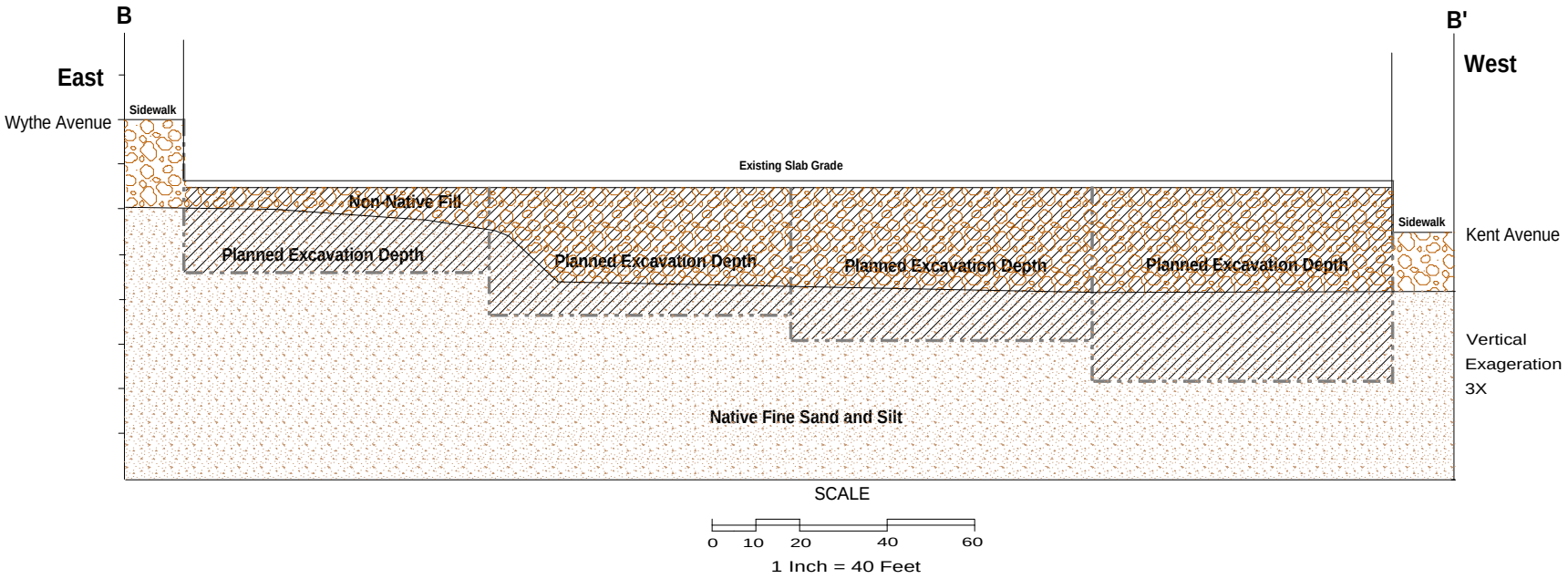

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FIGURE 20 Cross-Section B-B'

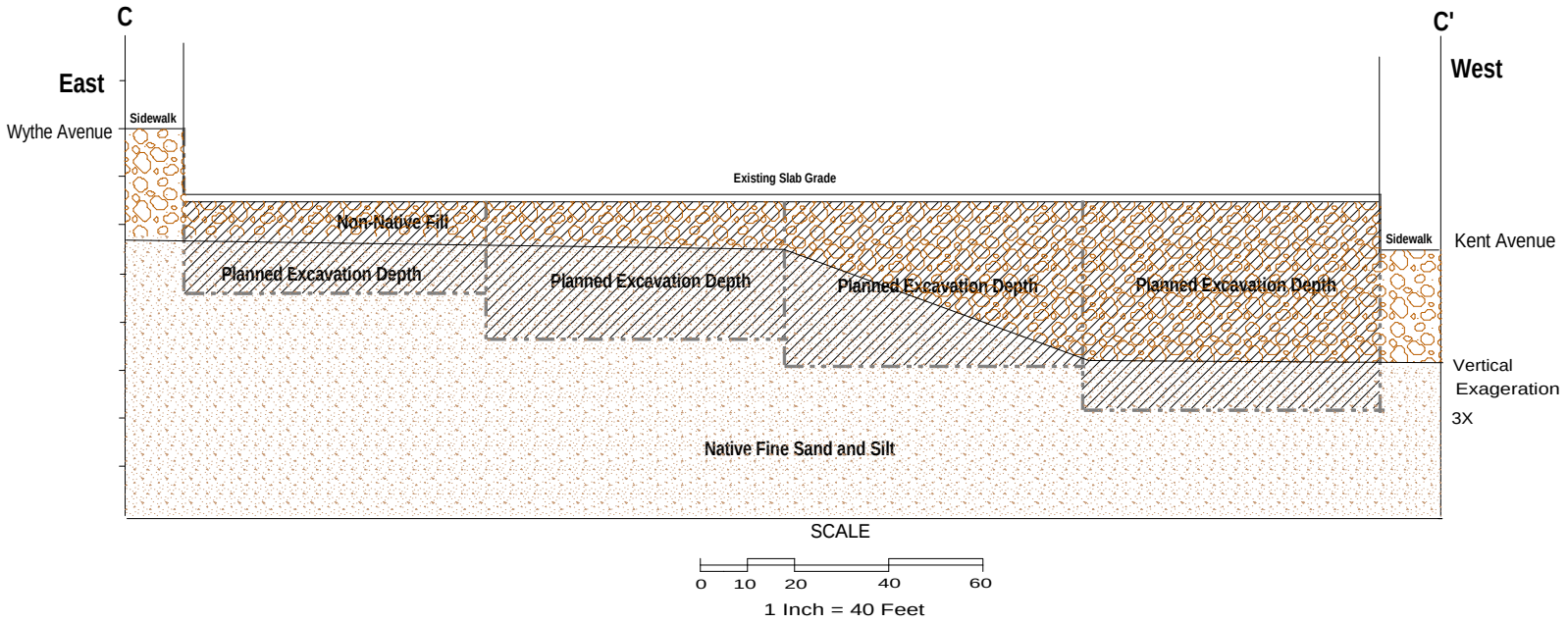

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FIGURE 21 Cross-Section C-C'

ATTACHMENT A
Metes and Bounds Description of Property

METES AND BOUNDS DESCRIPTION

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

BEGINNING at a point on the westerly side of Wythe Avenue distant 300 feet southerly from the corner formed by the intersection of the westerly side of Wythe Avenue and the southerly side of South 8th Street;

RUNNING THENCE southerly along the westerly side of Wythe Avenue 200 feet to the northerly side of South 10th Street;

RUNNING THENCE westerly along the northerly side of South 10th Street, 284 feet 1-5/16 inches to the easterly side of Kent Avenue;

*RUNNING THENCE northerly along the easterly side of Kent Avenue, 203 feet **3-3/16inches**;*

RUNNING THENCE easterly parallel with South 9th Street, 320 feet 4-11/16 inches to the westerly side of Wythe Avenue, the point or place of BEGINNING.

And

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

BEGINNING at a point on the westerly side of Wythe Avenue distant 560 feet southerly from the corner formed by the intersection of the westerly side of Wythe Avenue and the southerly side of South 8th Street;

RUNNING THENCE southerly along the westerly side of Wythe Avenue 200 feet to the northerly side of South 11th Street;

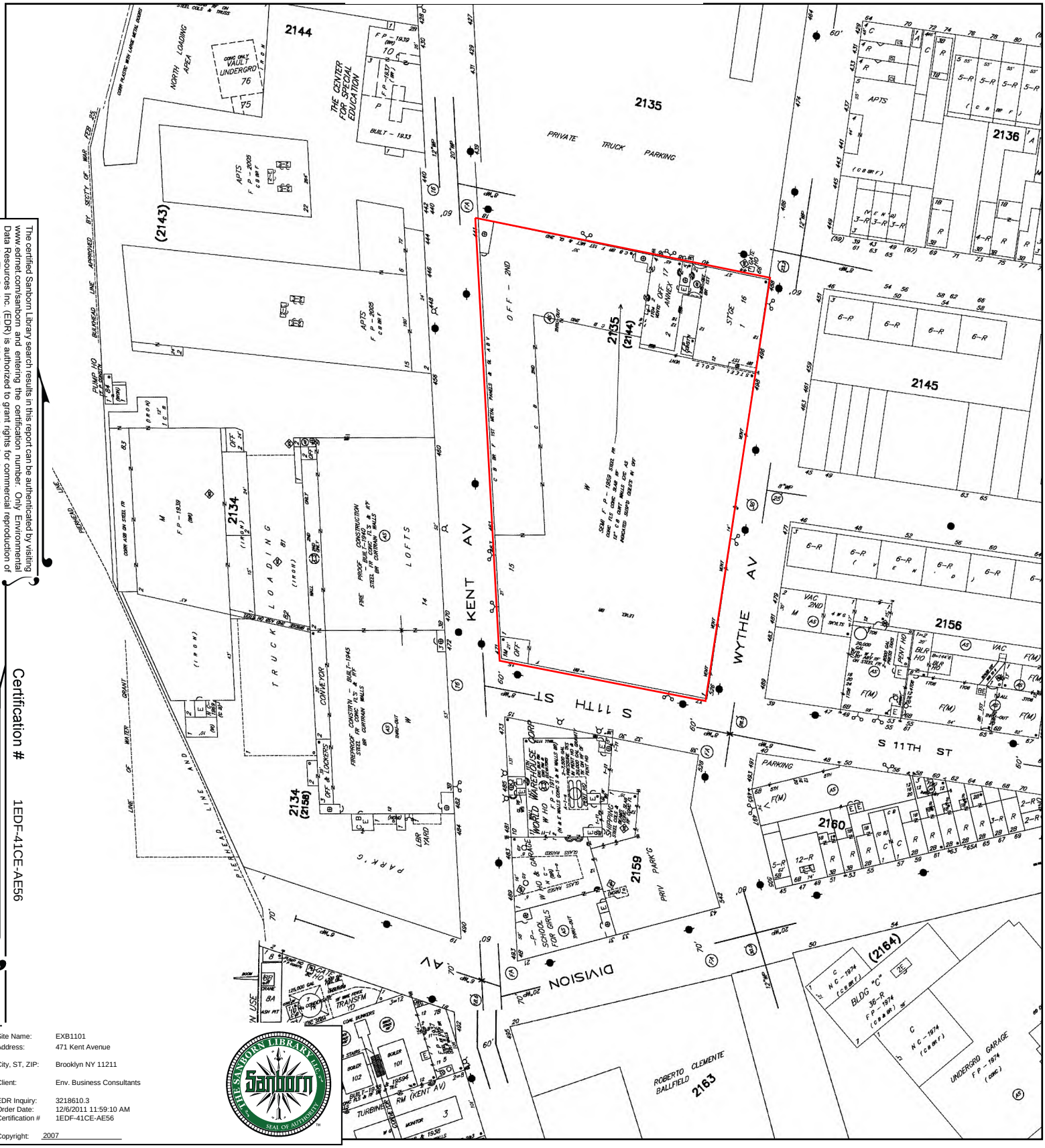
RUNNING THENCE westerly along the northerly side of South 11th Street, 236 feet 11-1/4 inches to the easterly side of Kent Avenue;

*RUNNING THENCE northerly along the easterly side of Kent Avenue, 203 feet **3-3/16 inches**;*

RUNNING THENCE easterly parallel with South 10th Street, 273 feet 2-5/8 inches to the westerly side of Wythe Avenue, the point or place of BEGINNING.

ATTACHMENT B
Sanborn Maps

2007 Certified Sanborn Map



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Certification # 1EDF-41CE-AE56

Site Name:	EXB1101
Address:	471 Kent Avenue
City, ST, ZIP:	Brooklyn NY 11211
Client:	Env. Business Consultants
EDR Inquiry:	3218610.3
Order Date:	12/6/2011 11:59:10 AM
Certification #	1EDF-41CE-AE56
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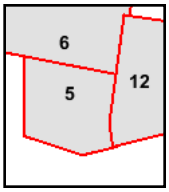

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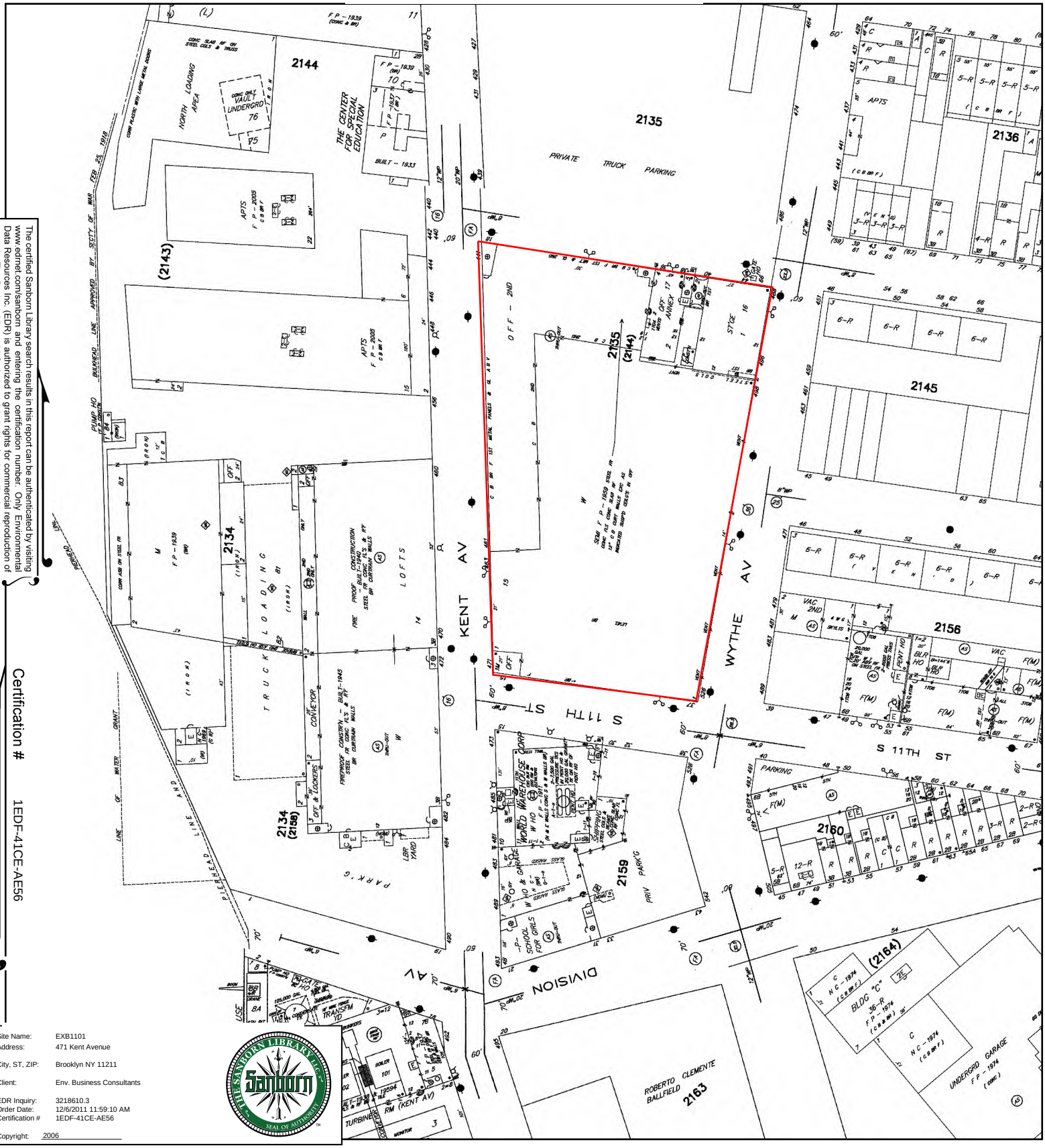
2006 Certified Sanborn Map



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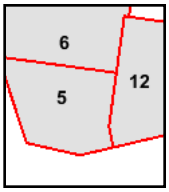

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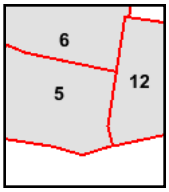

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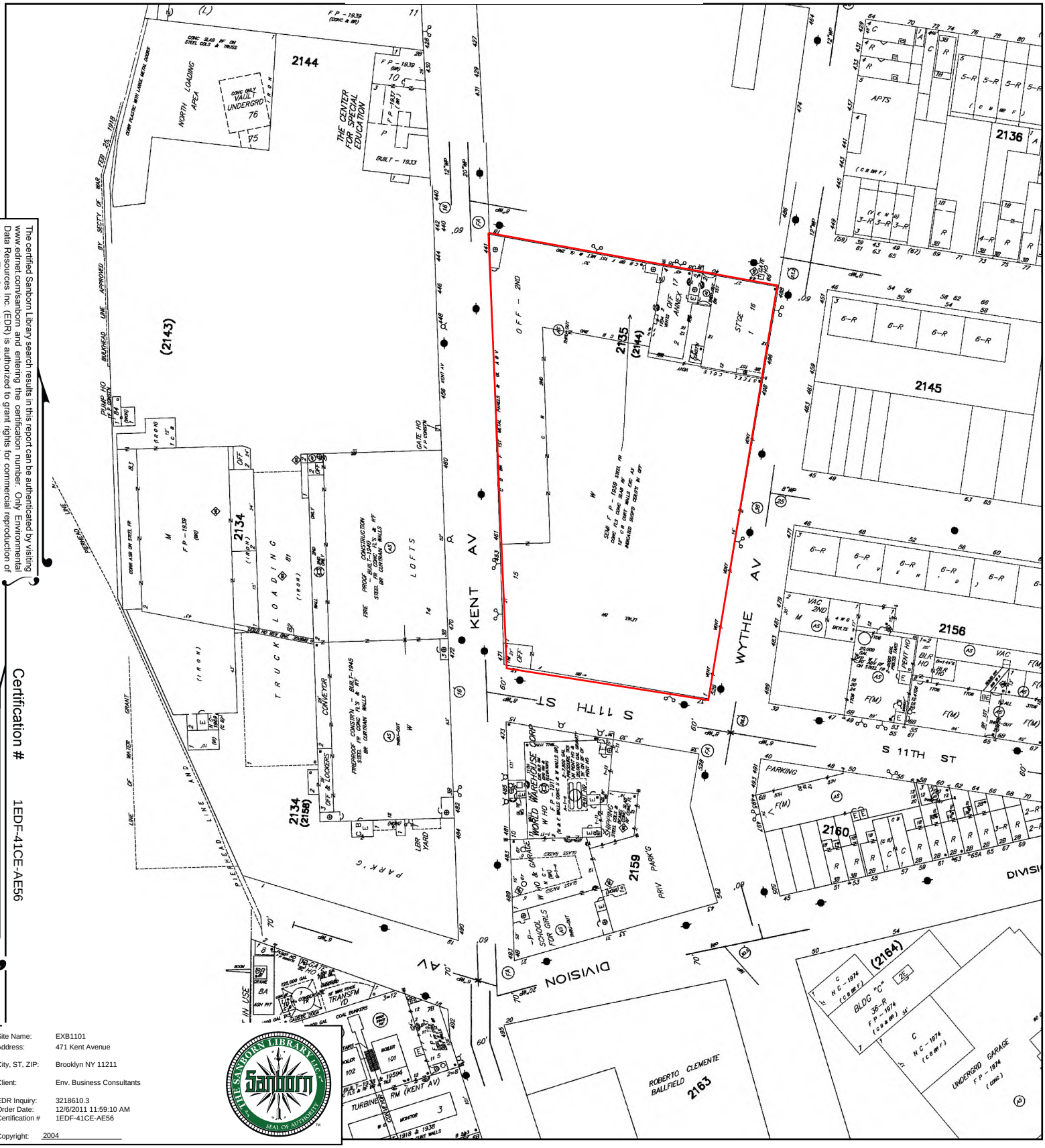

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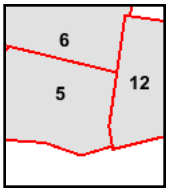

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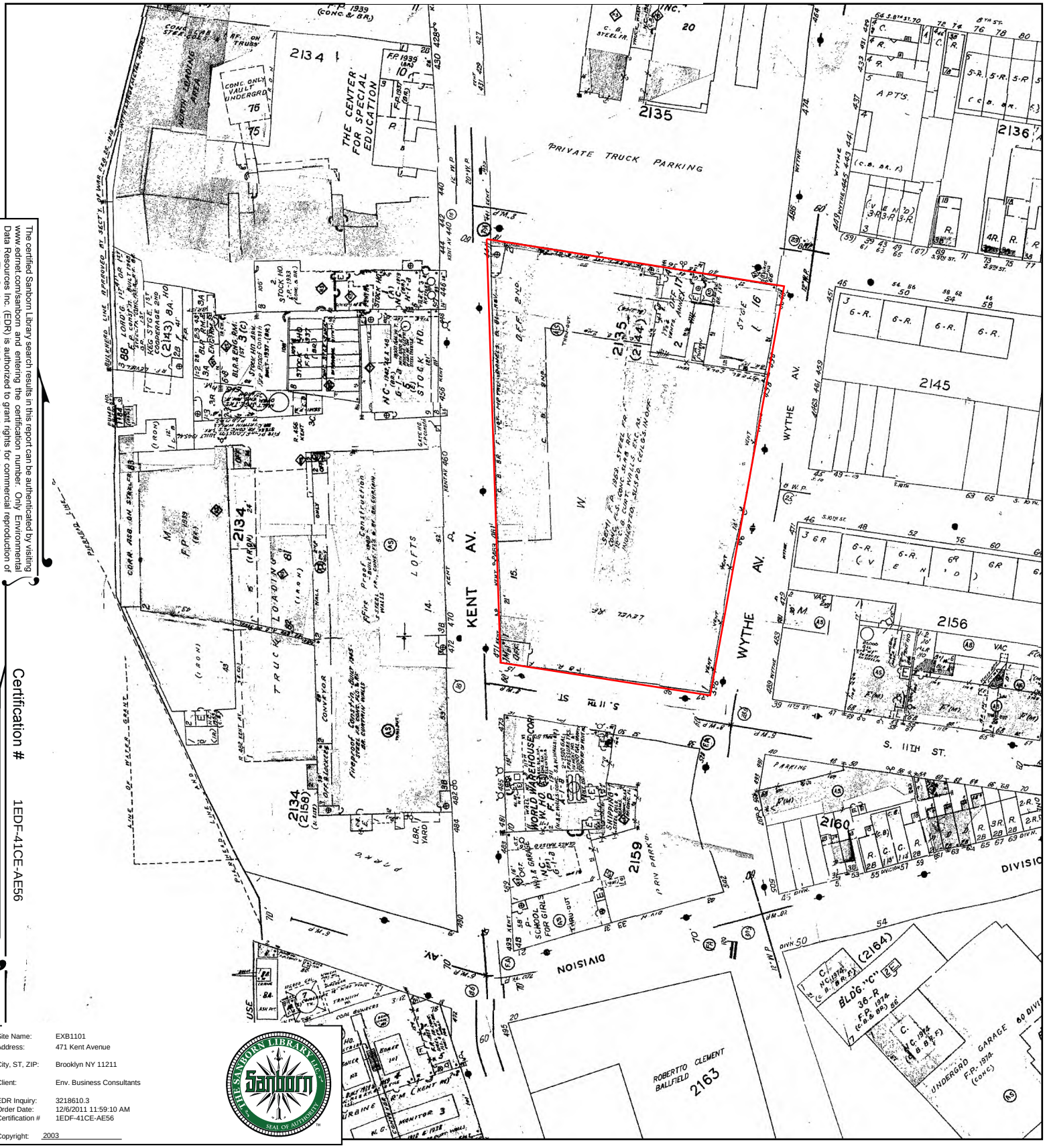

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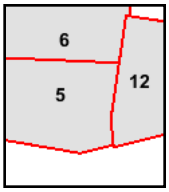

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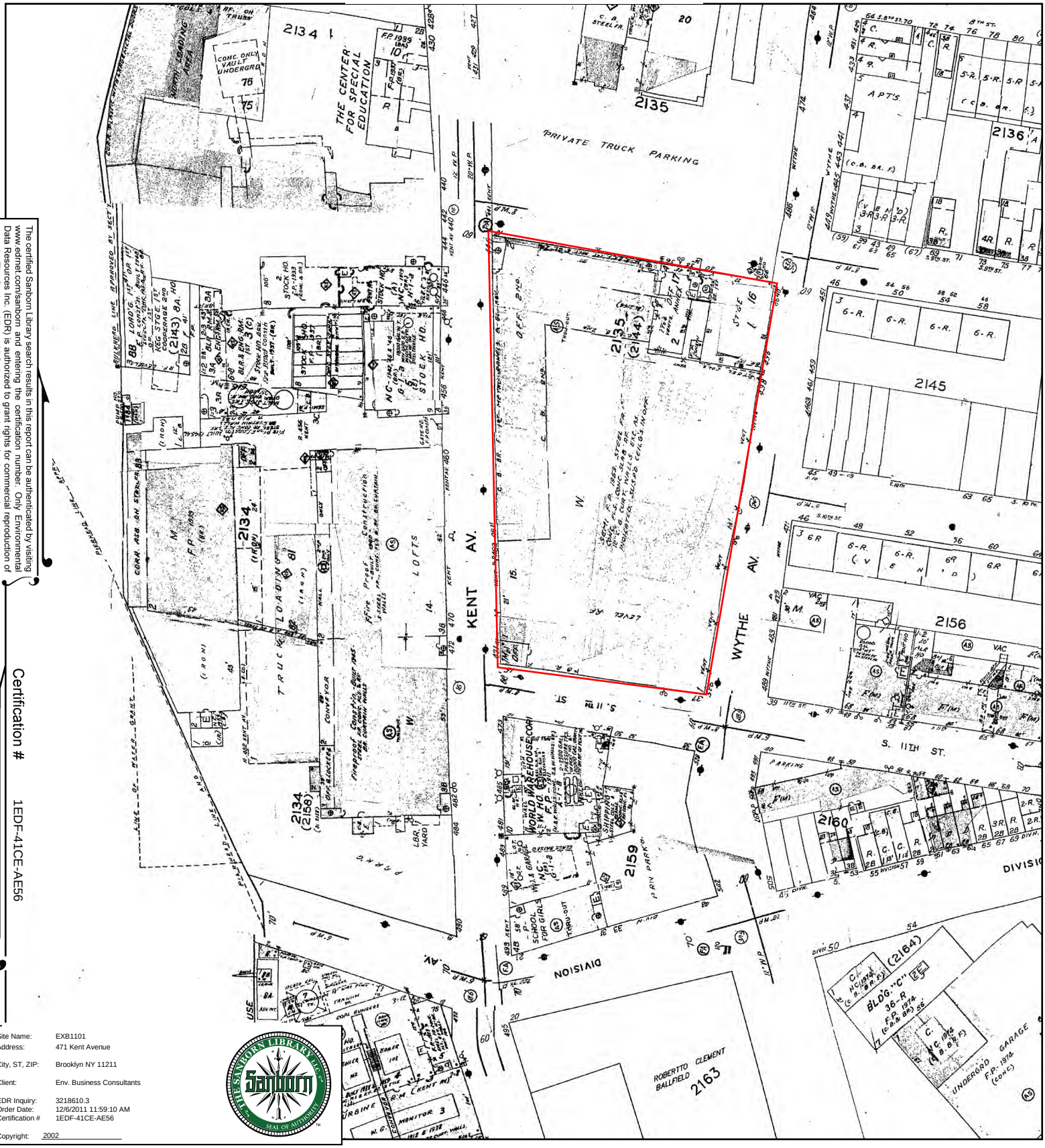

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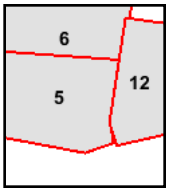

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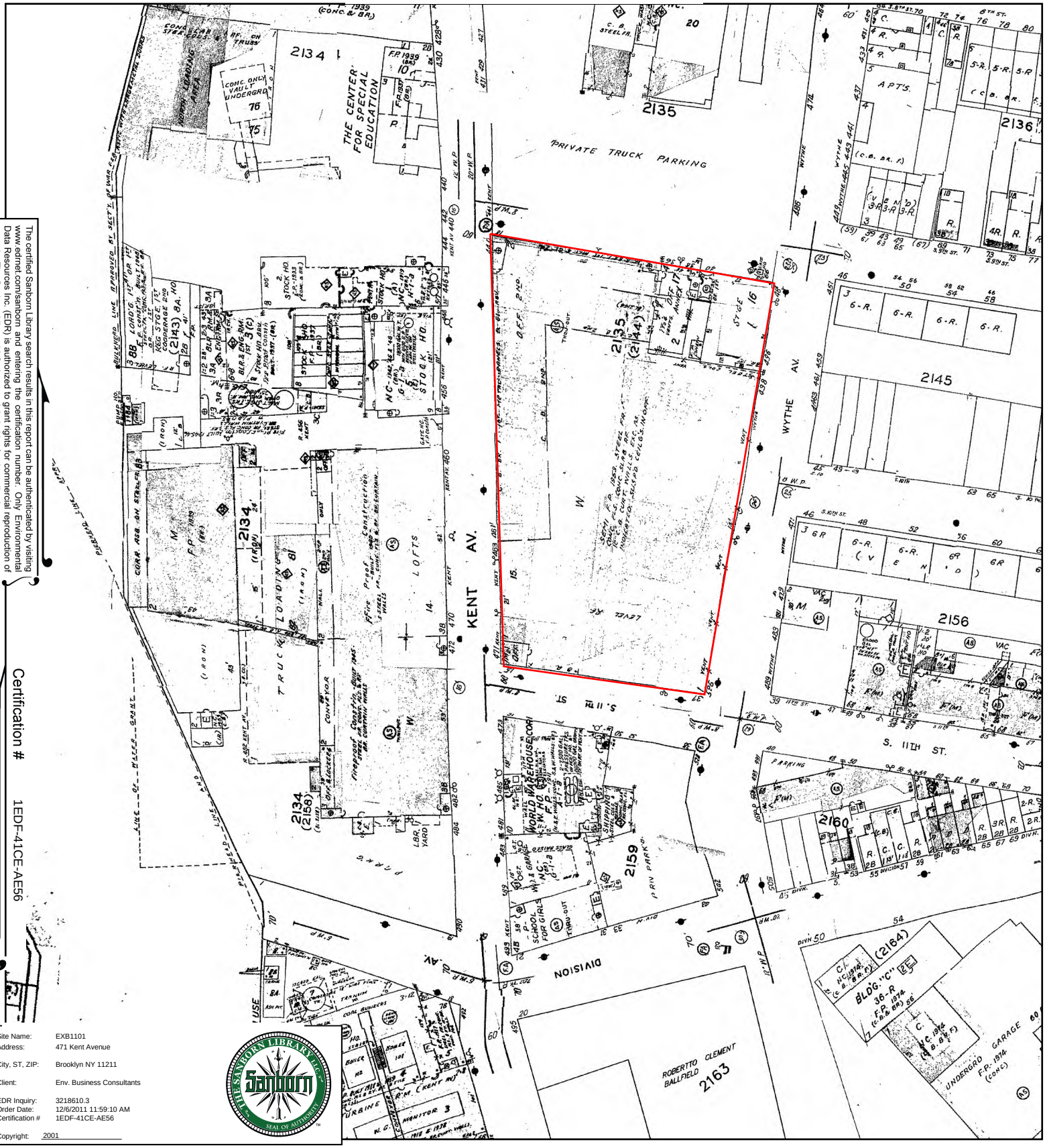

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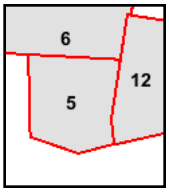

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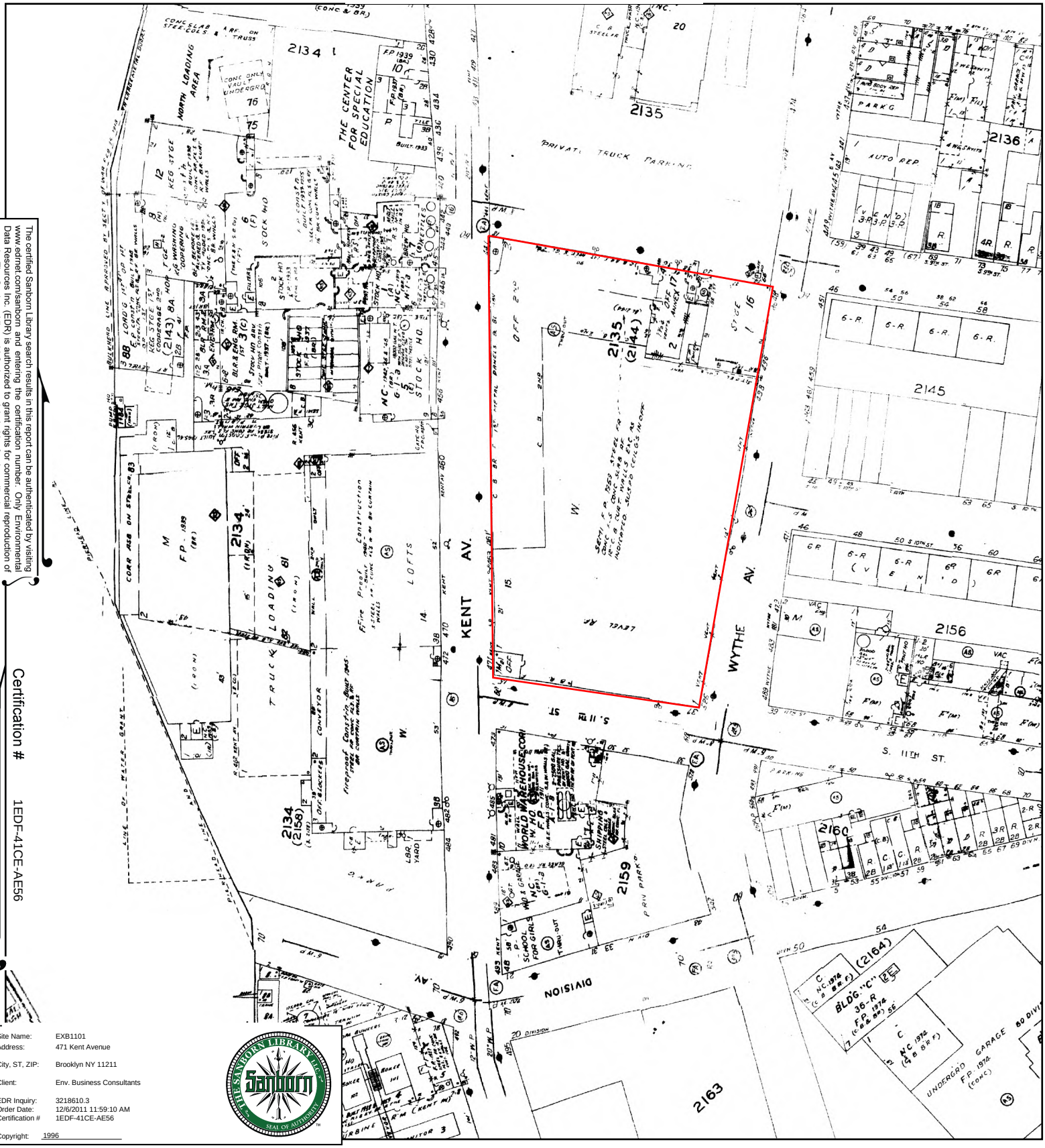

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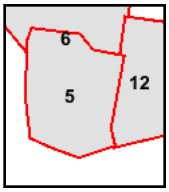

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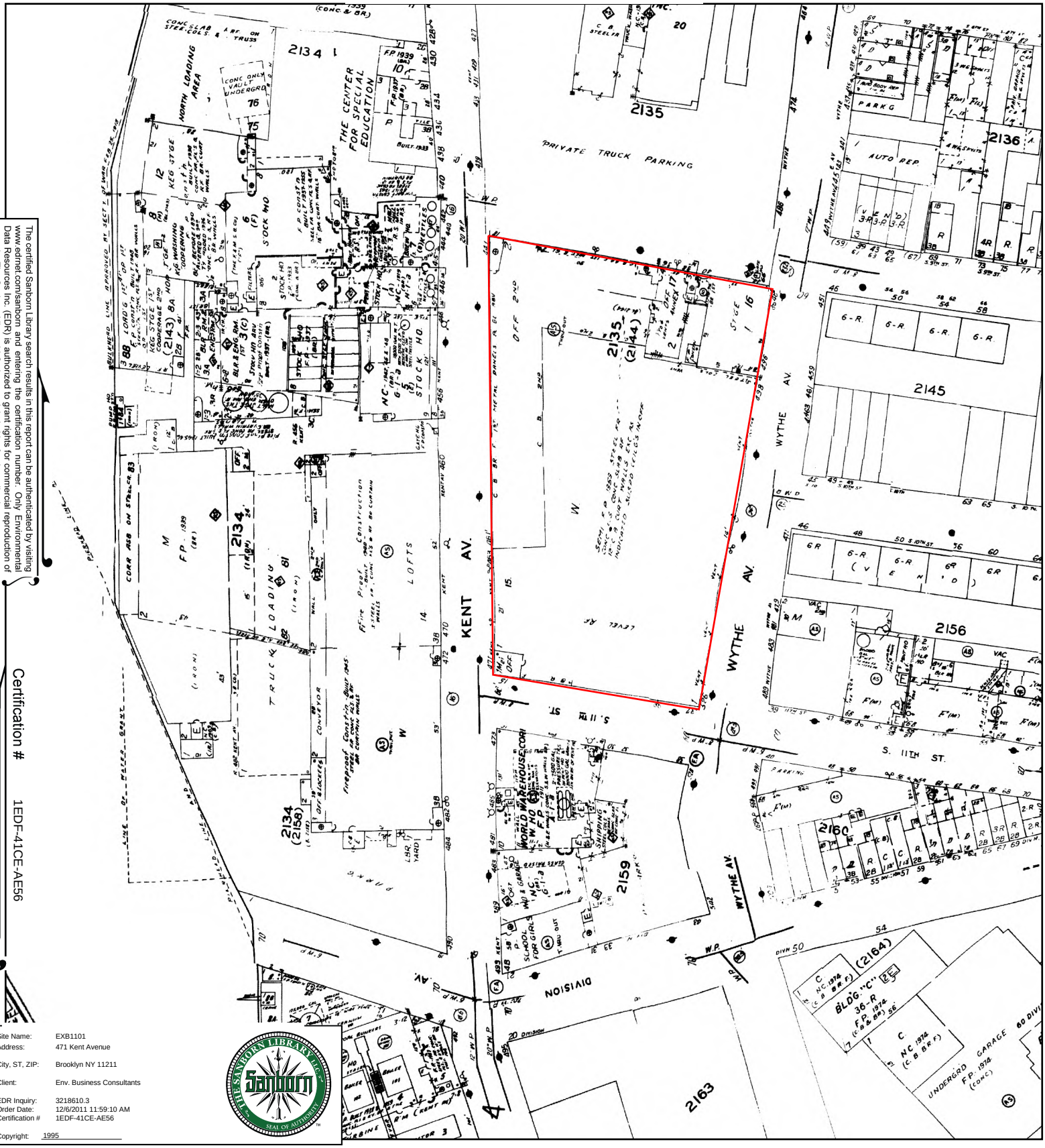

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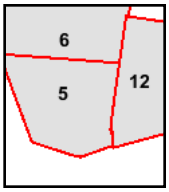

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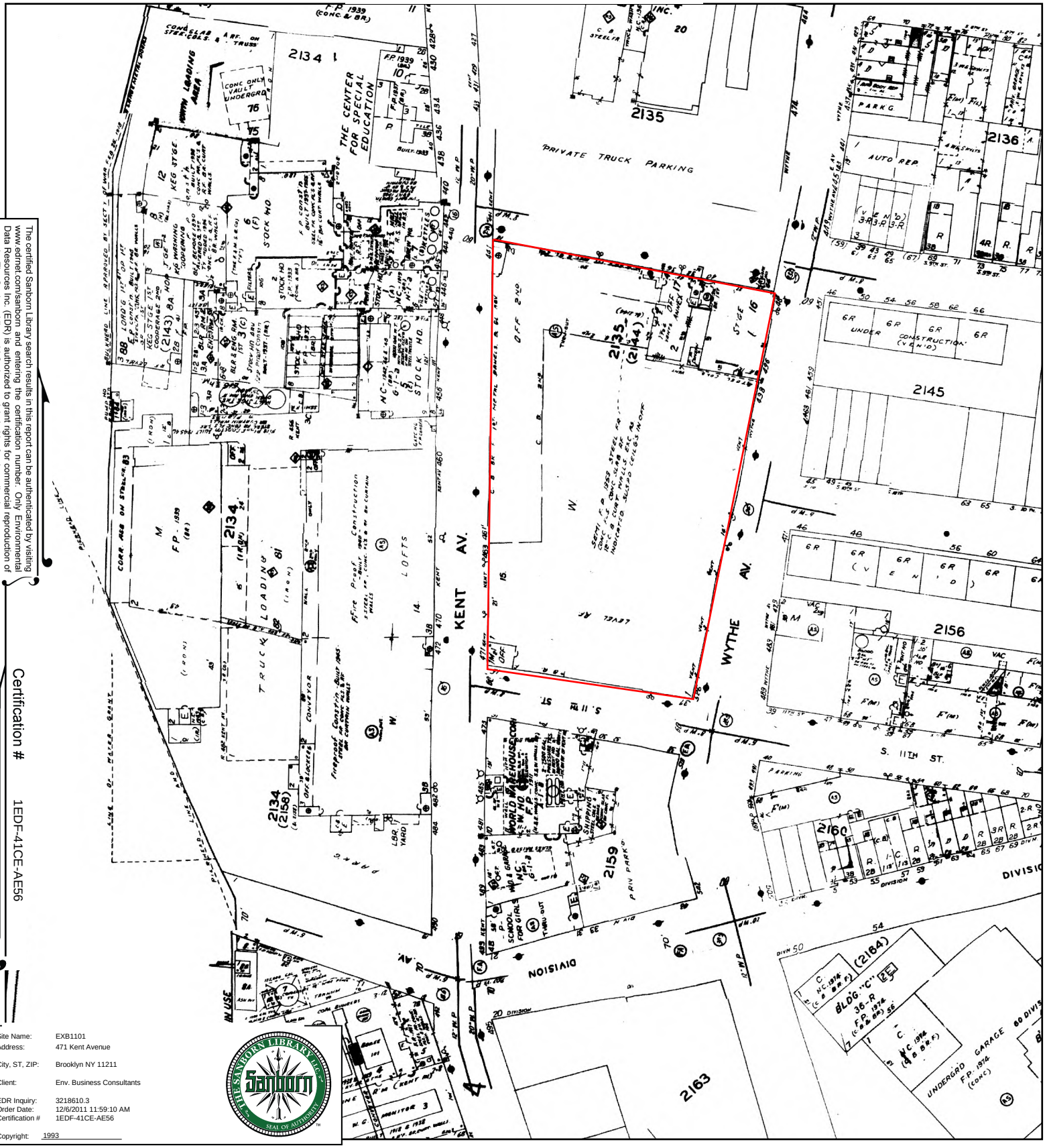

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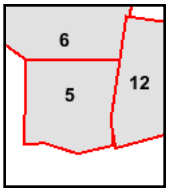

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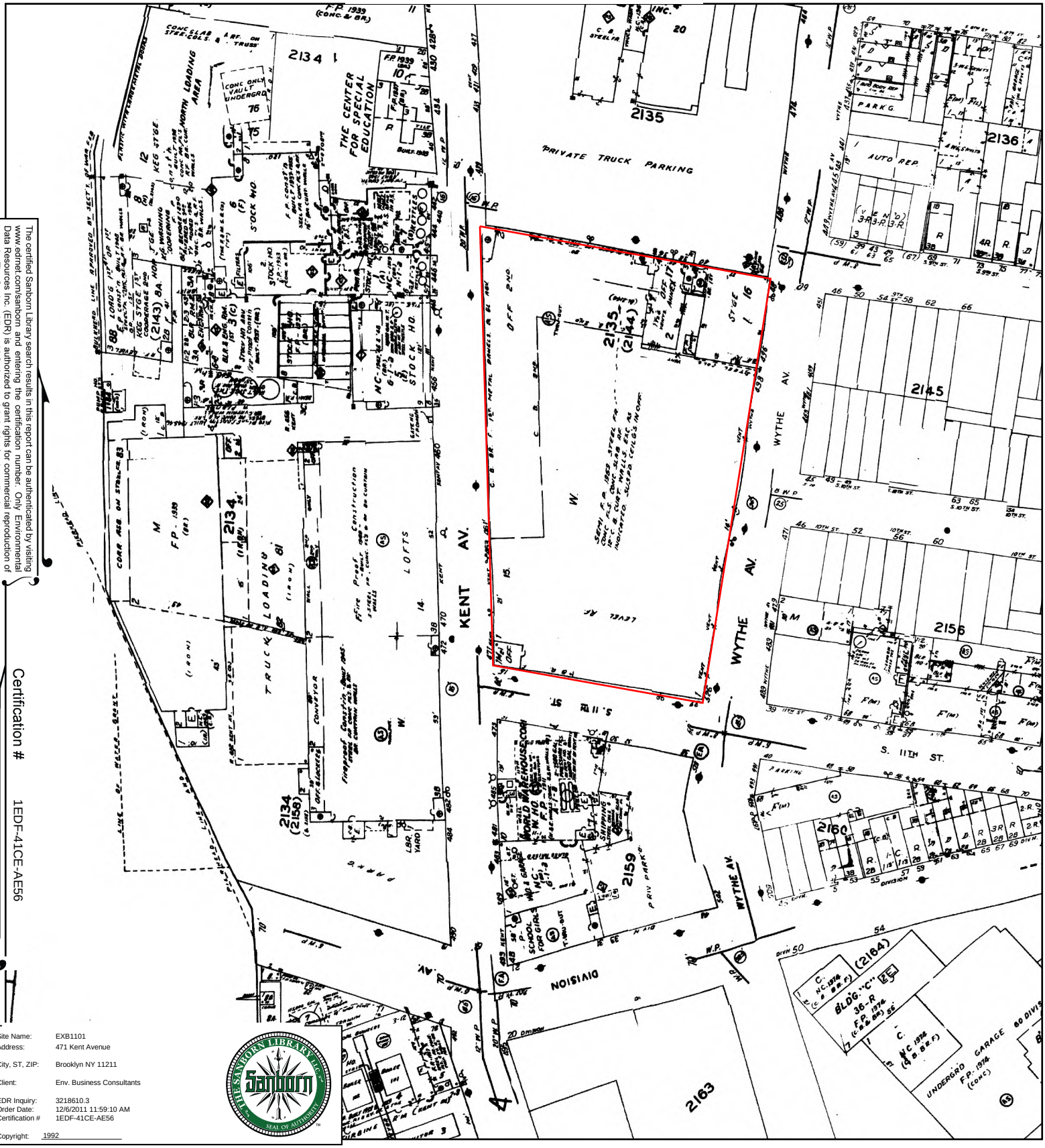

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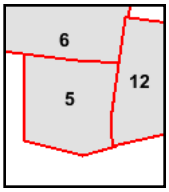

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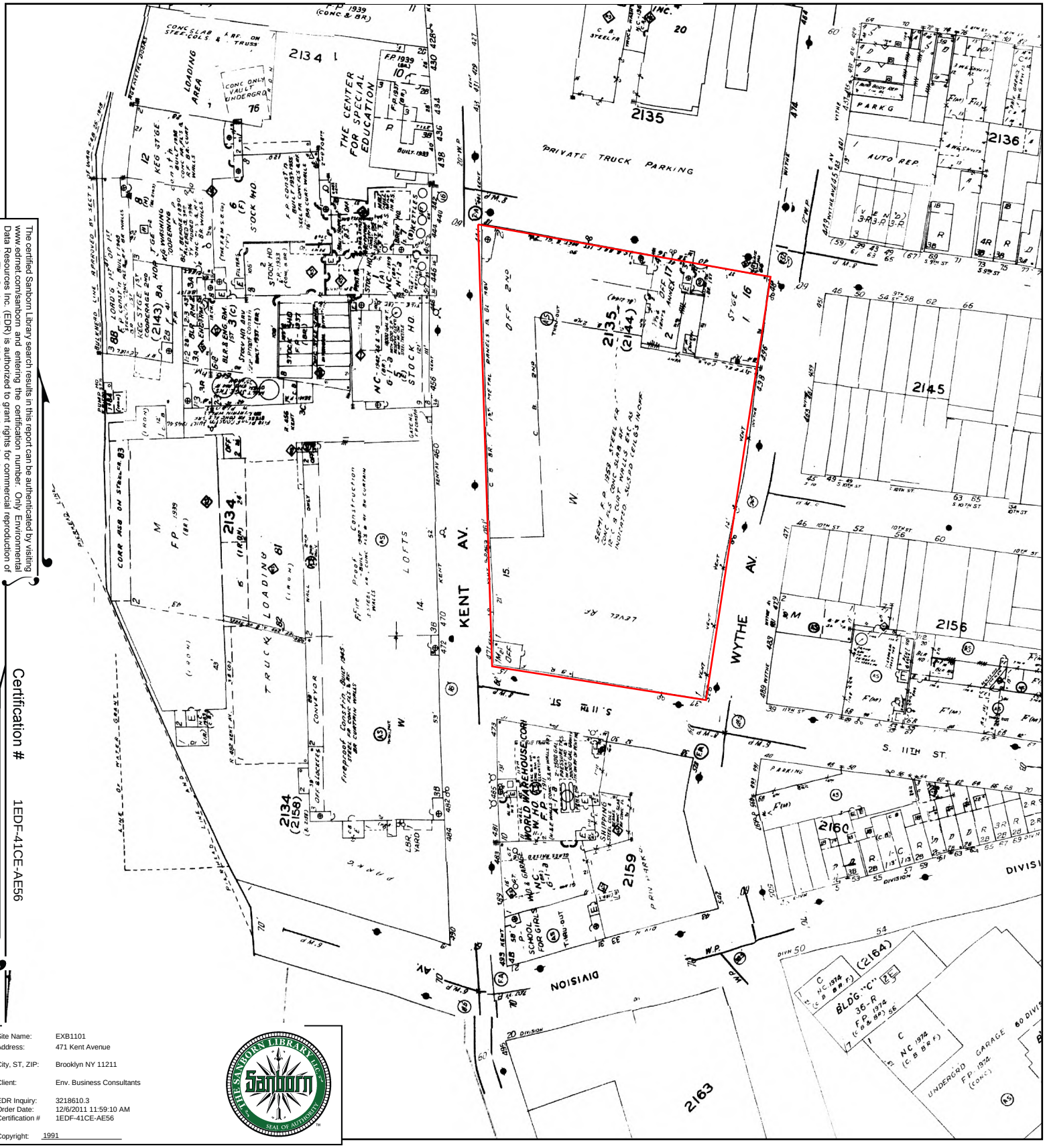

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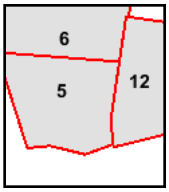

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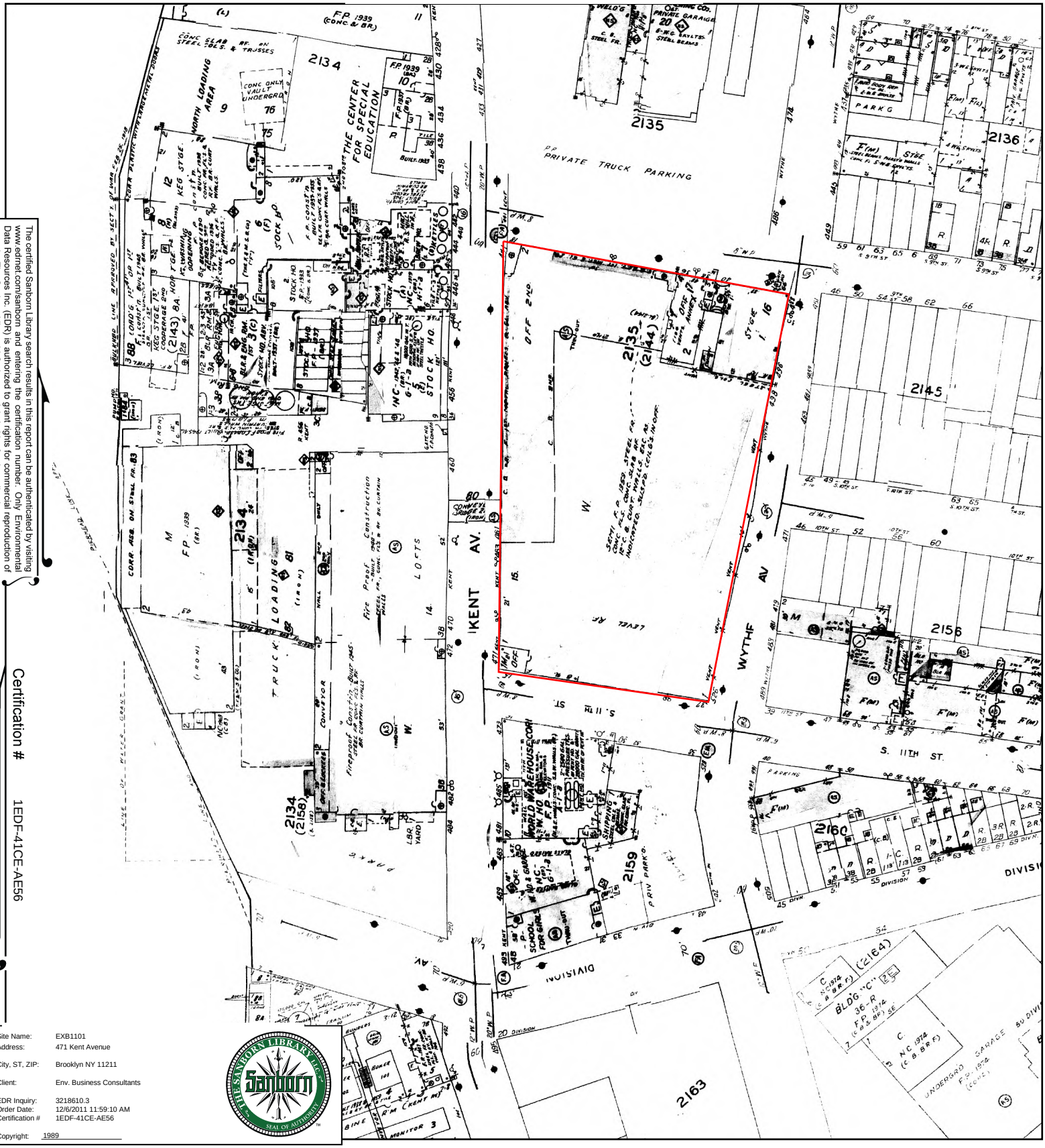

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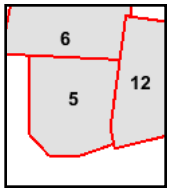

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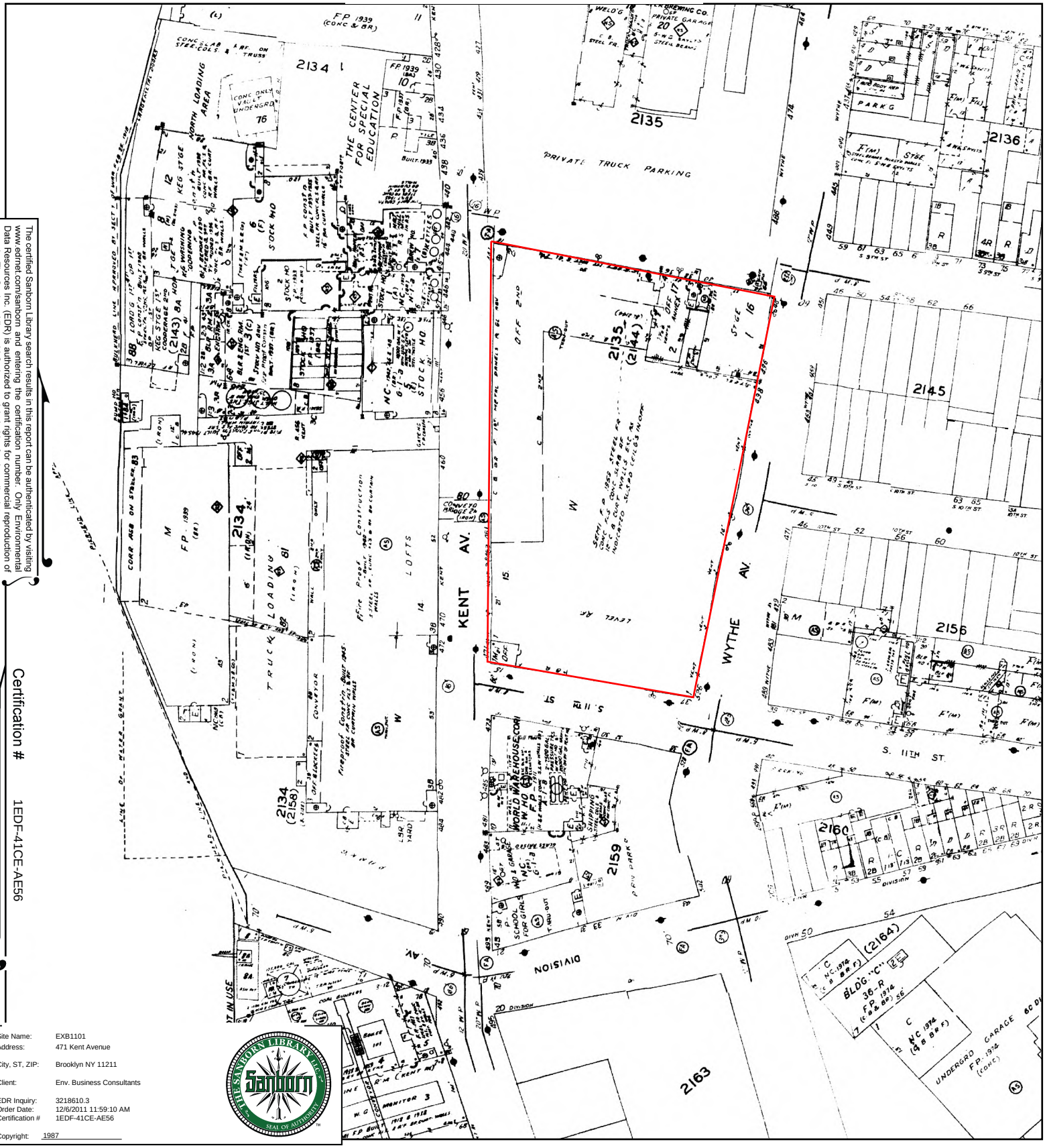

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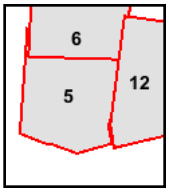

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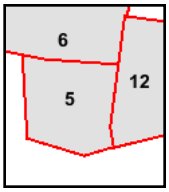

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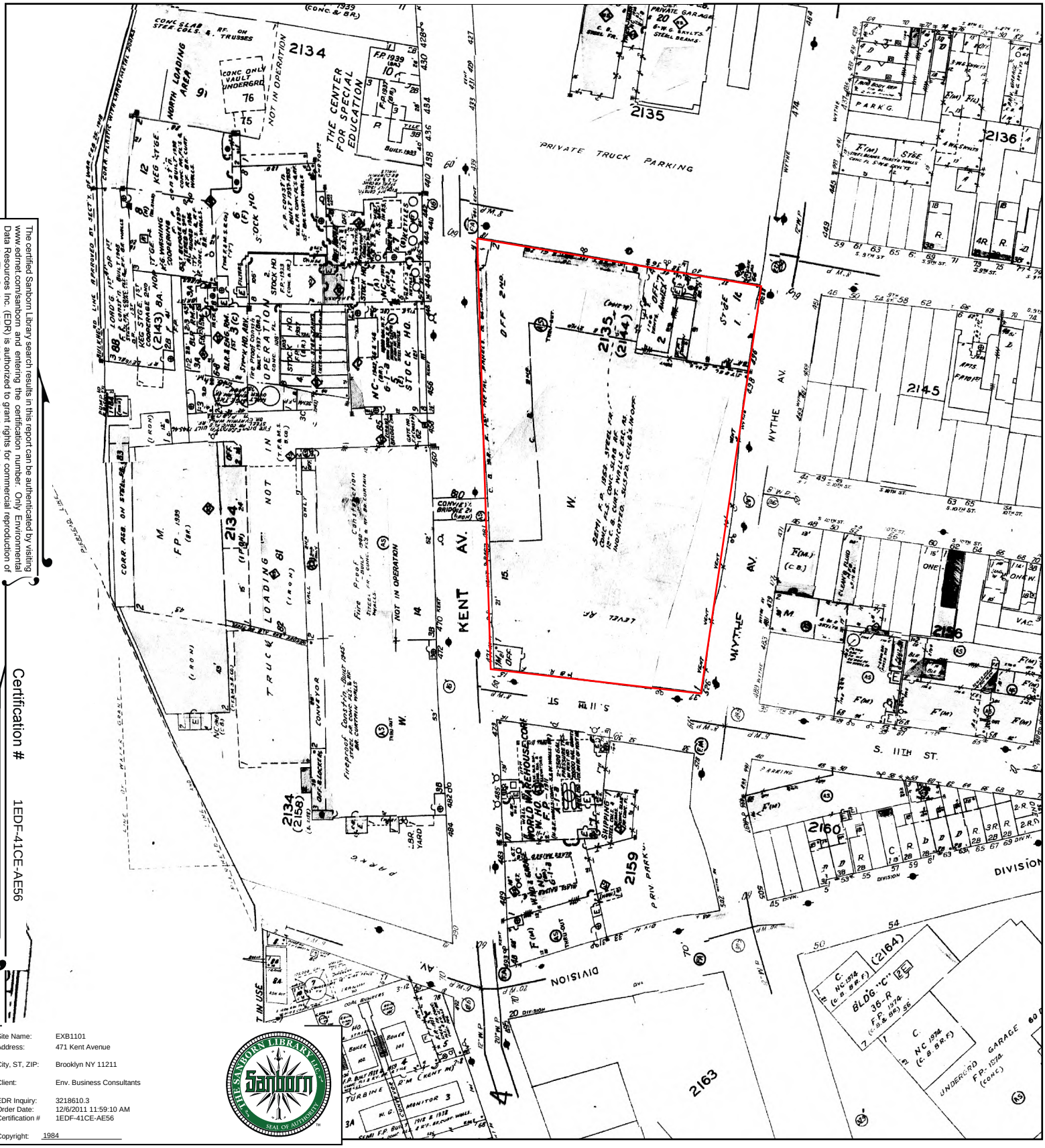

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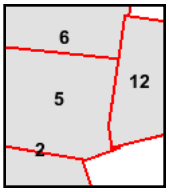

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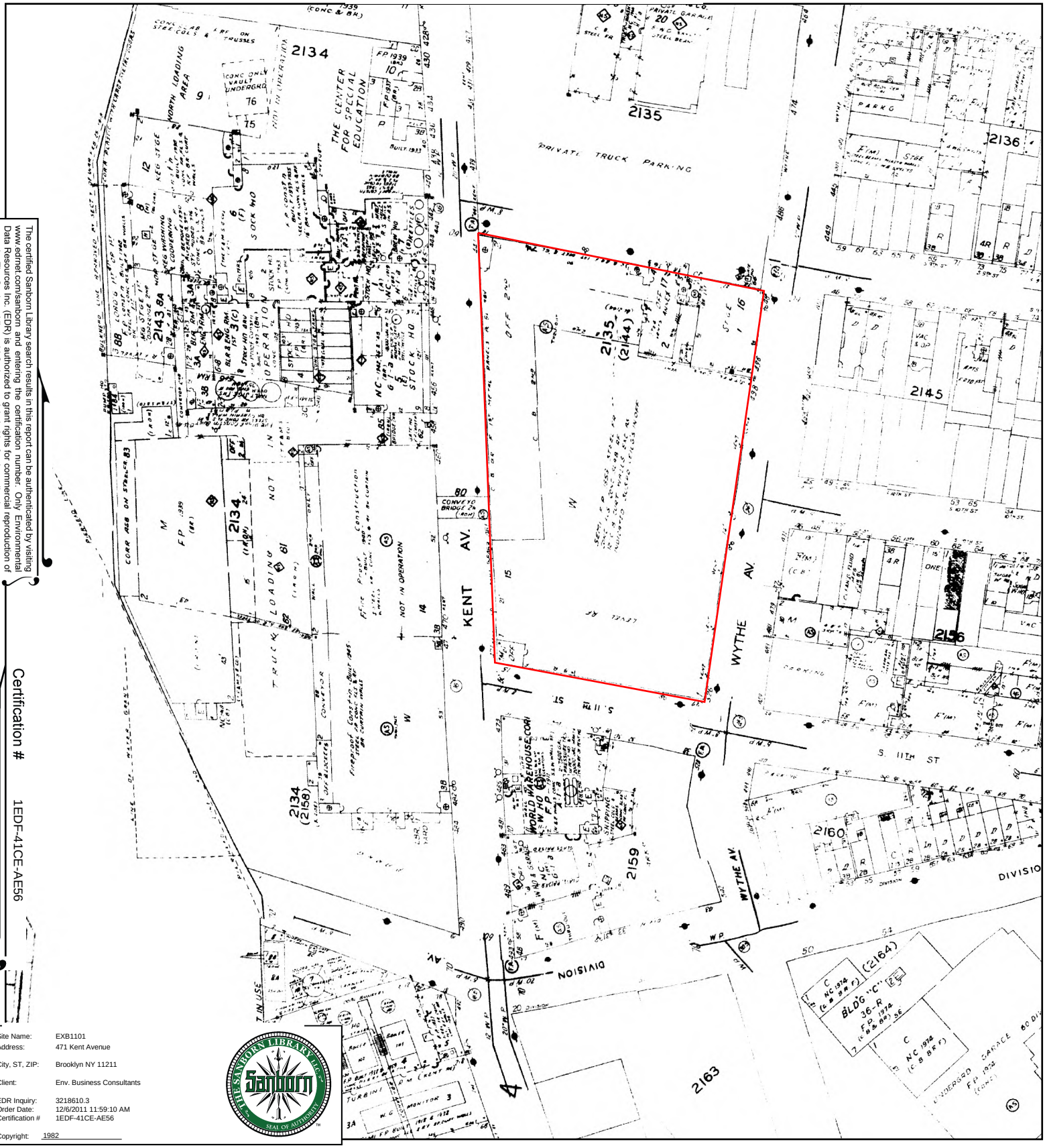

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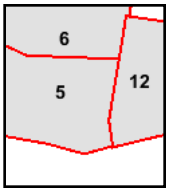

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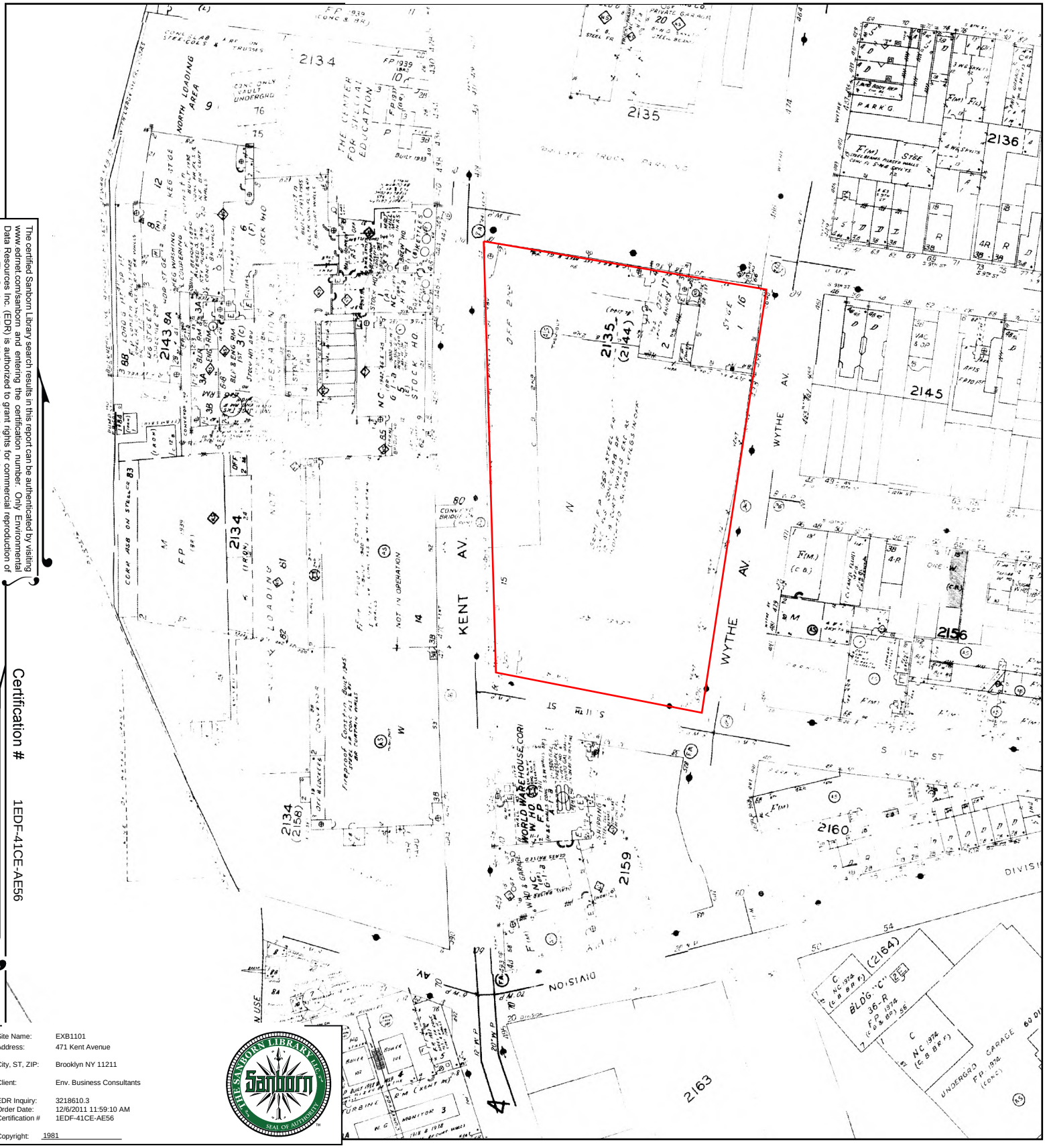

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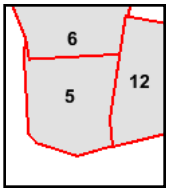

Volume 3, Sheet 5
Volume 3, Sheet 6
Volume 3, Sheet 12

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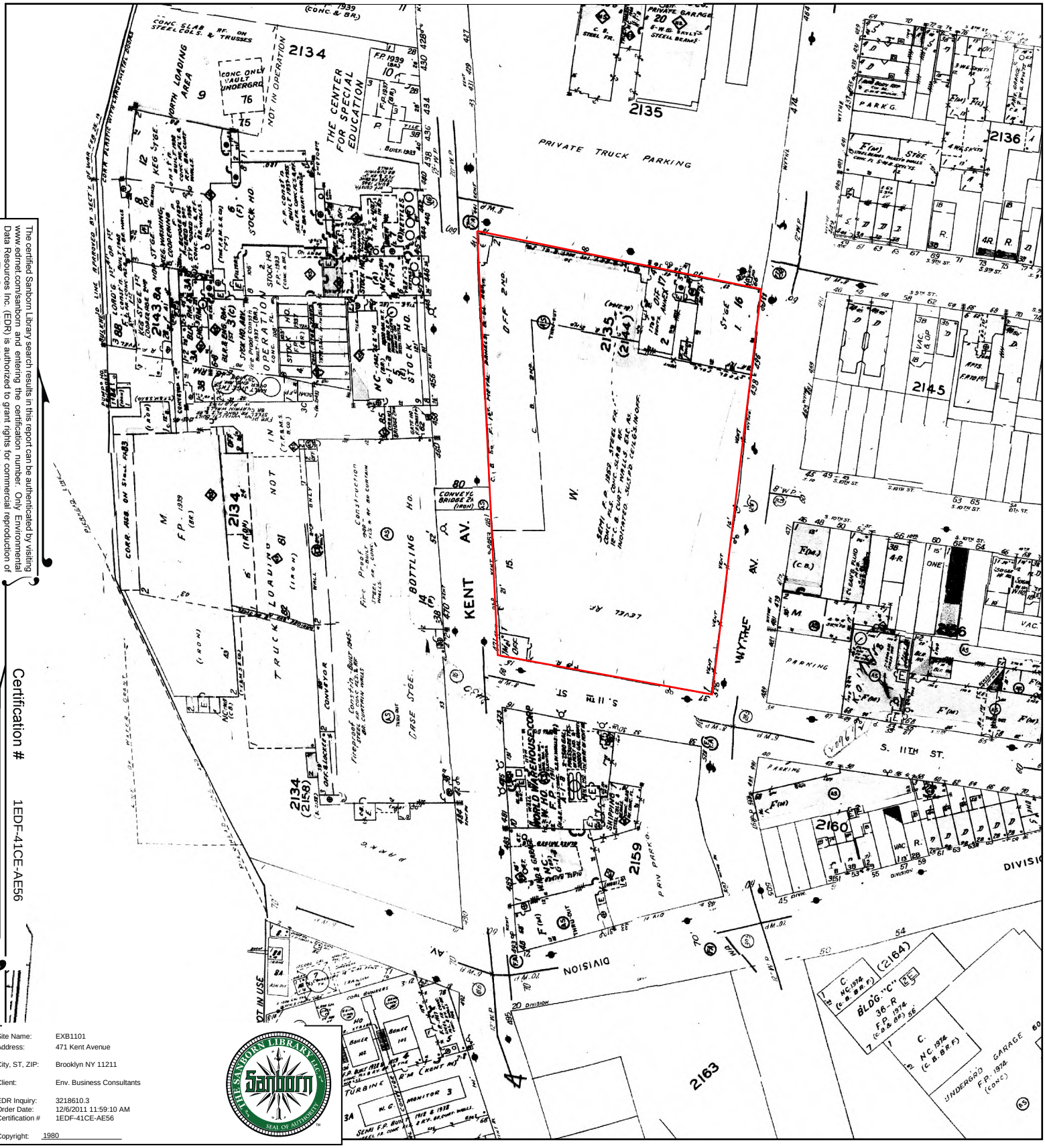
1980 Certified Sanborn Map



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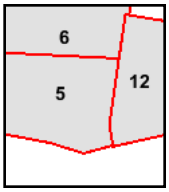

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Volume 3, Sheet 12

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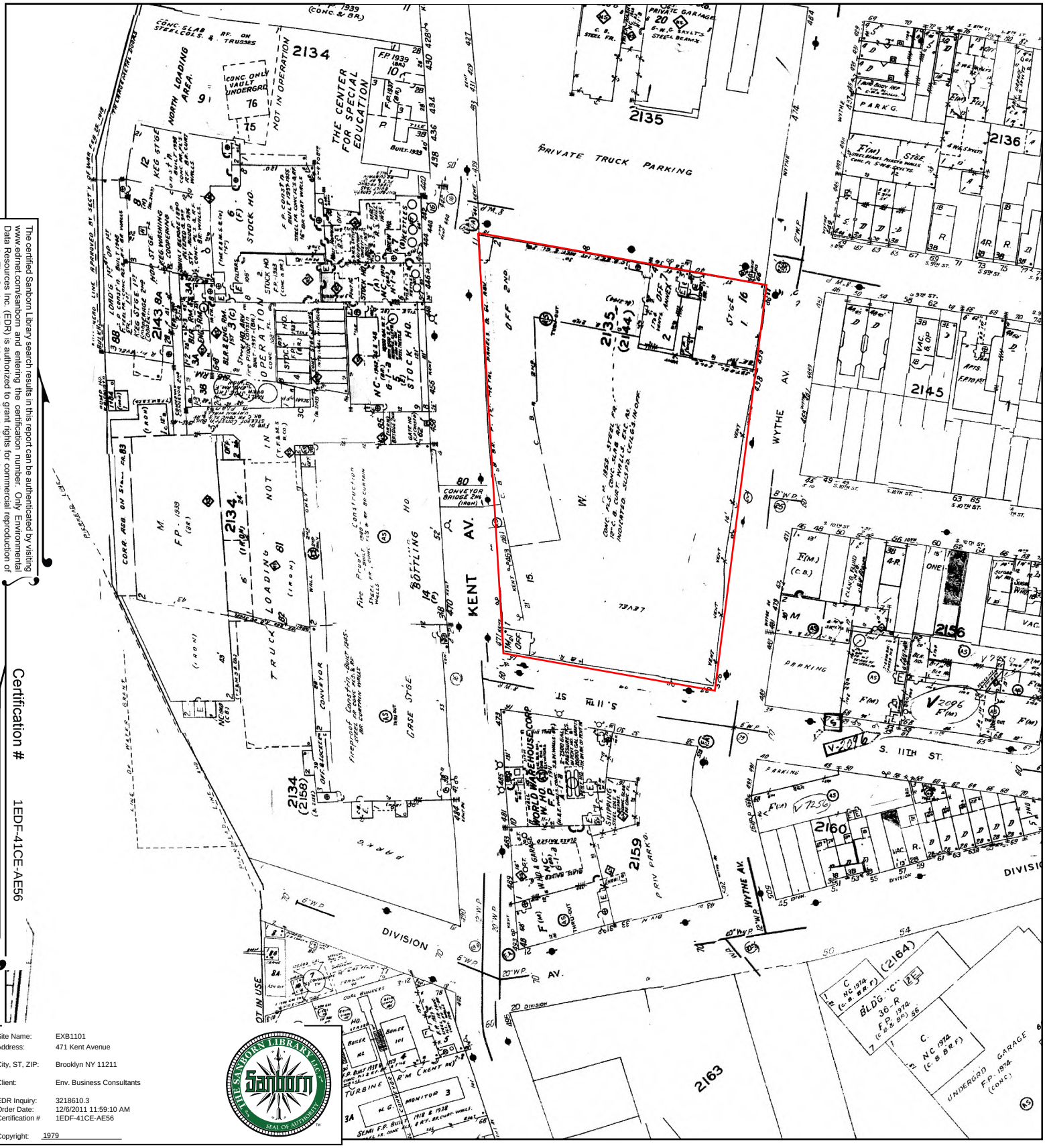

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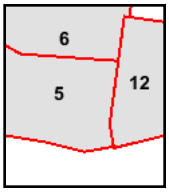

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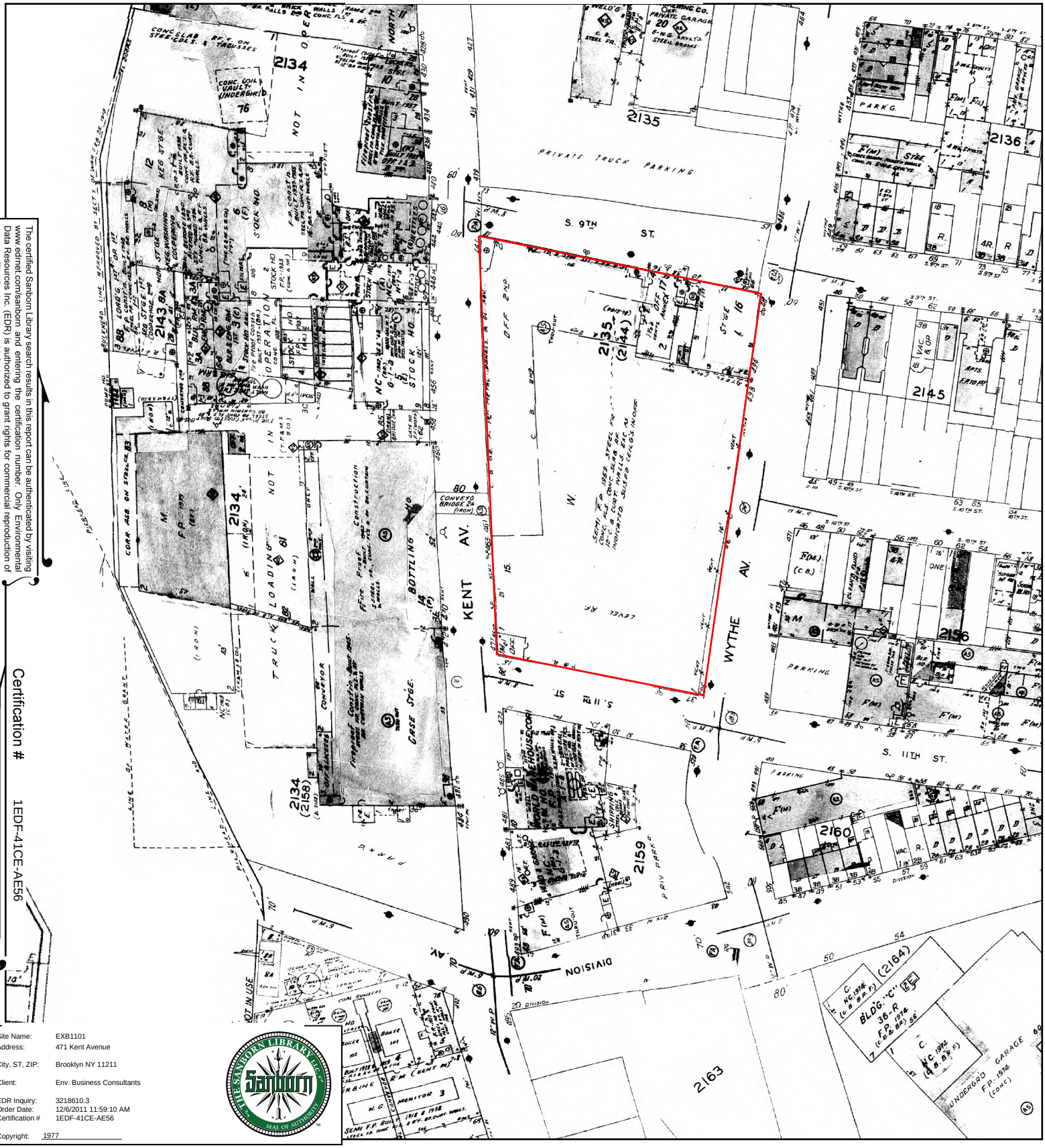

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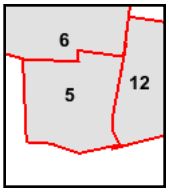

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Volume 3, Sheet 12

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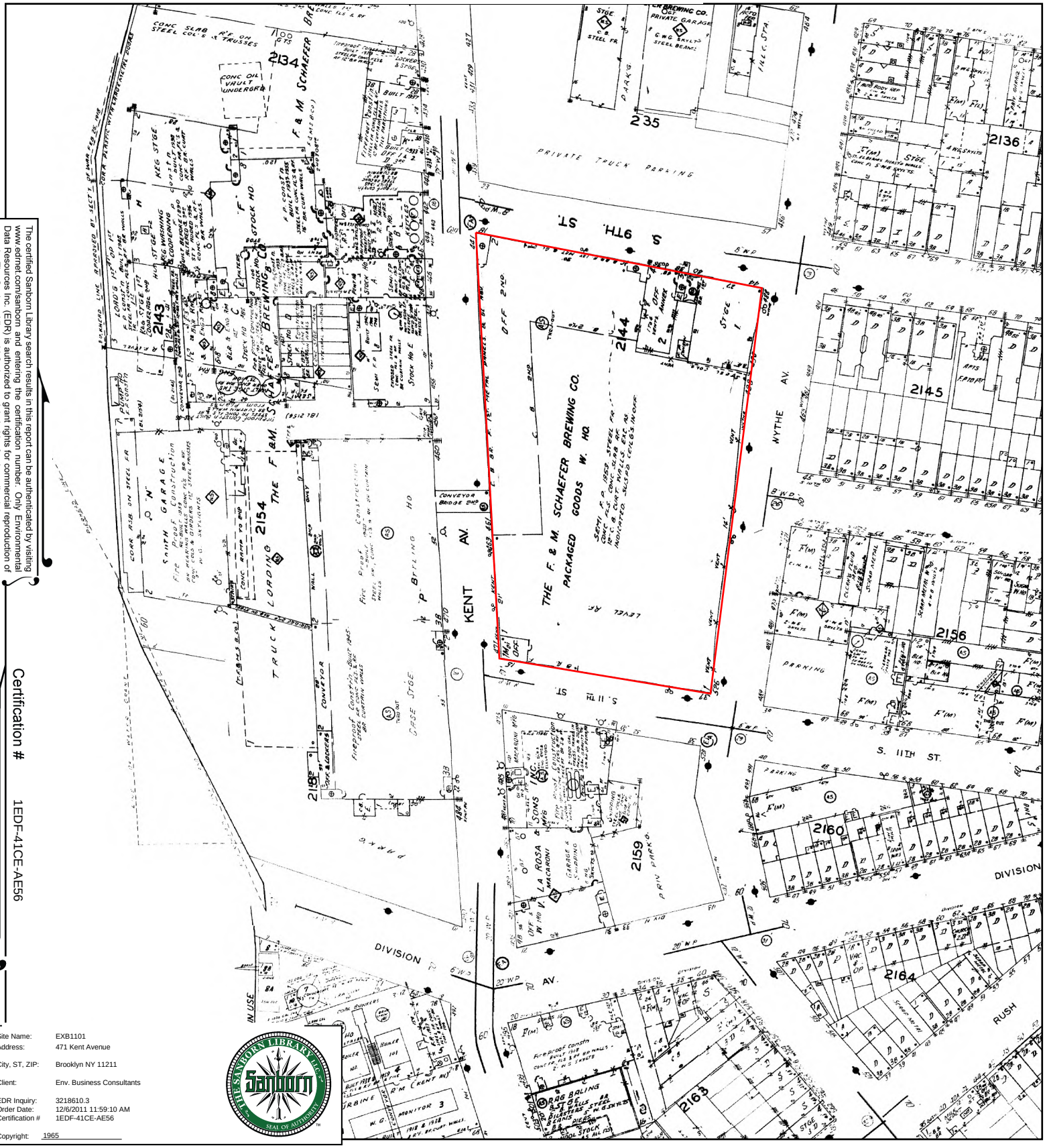

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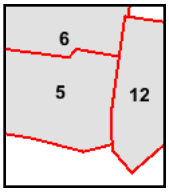

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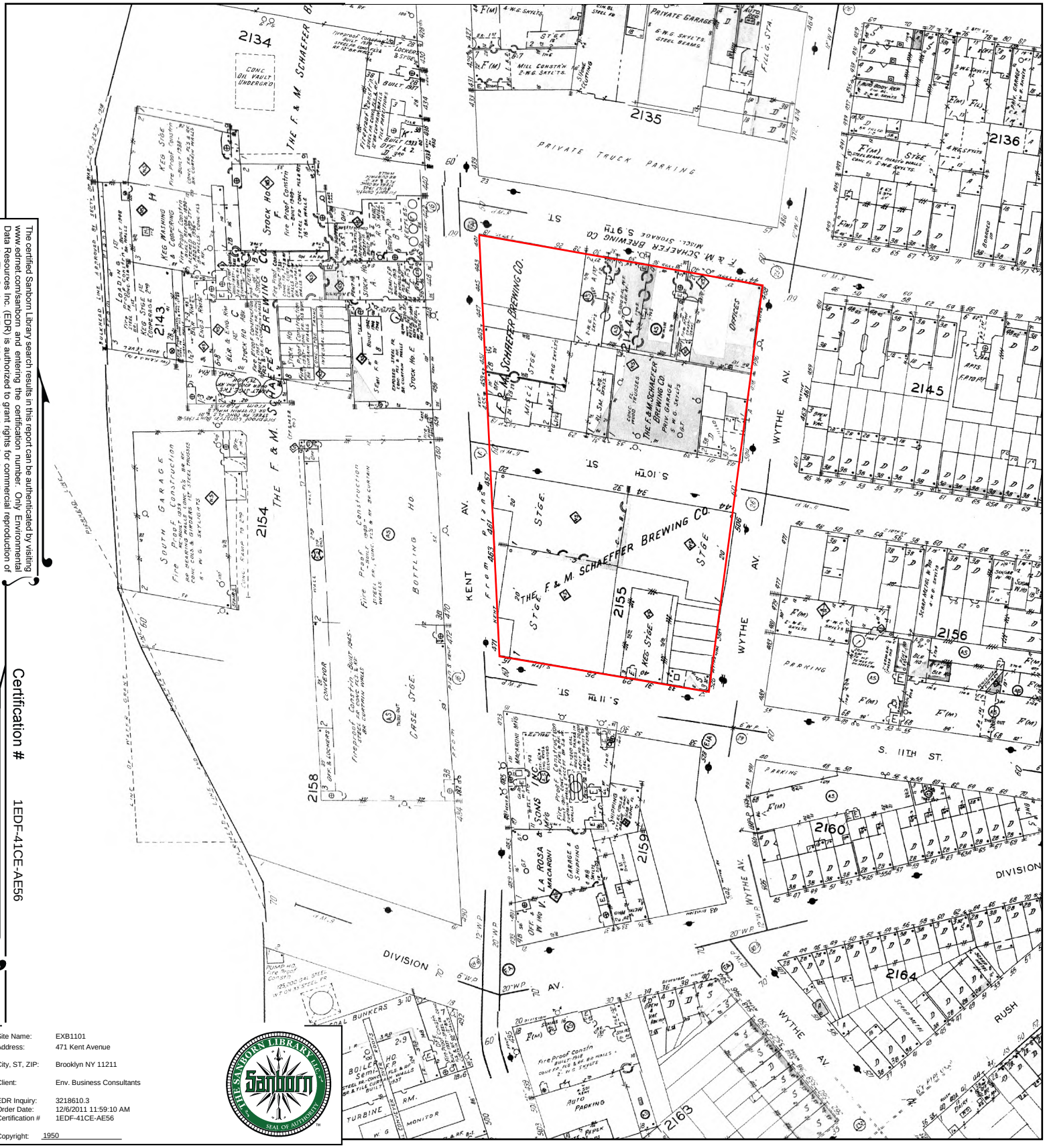

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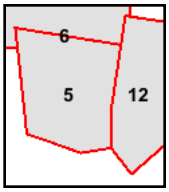

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Volume 3, Sheet 12

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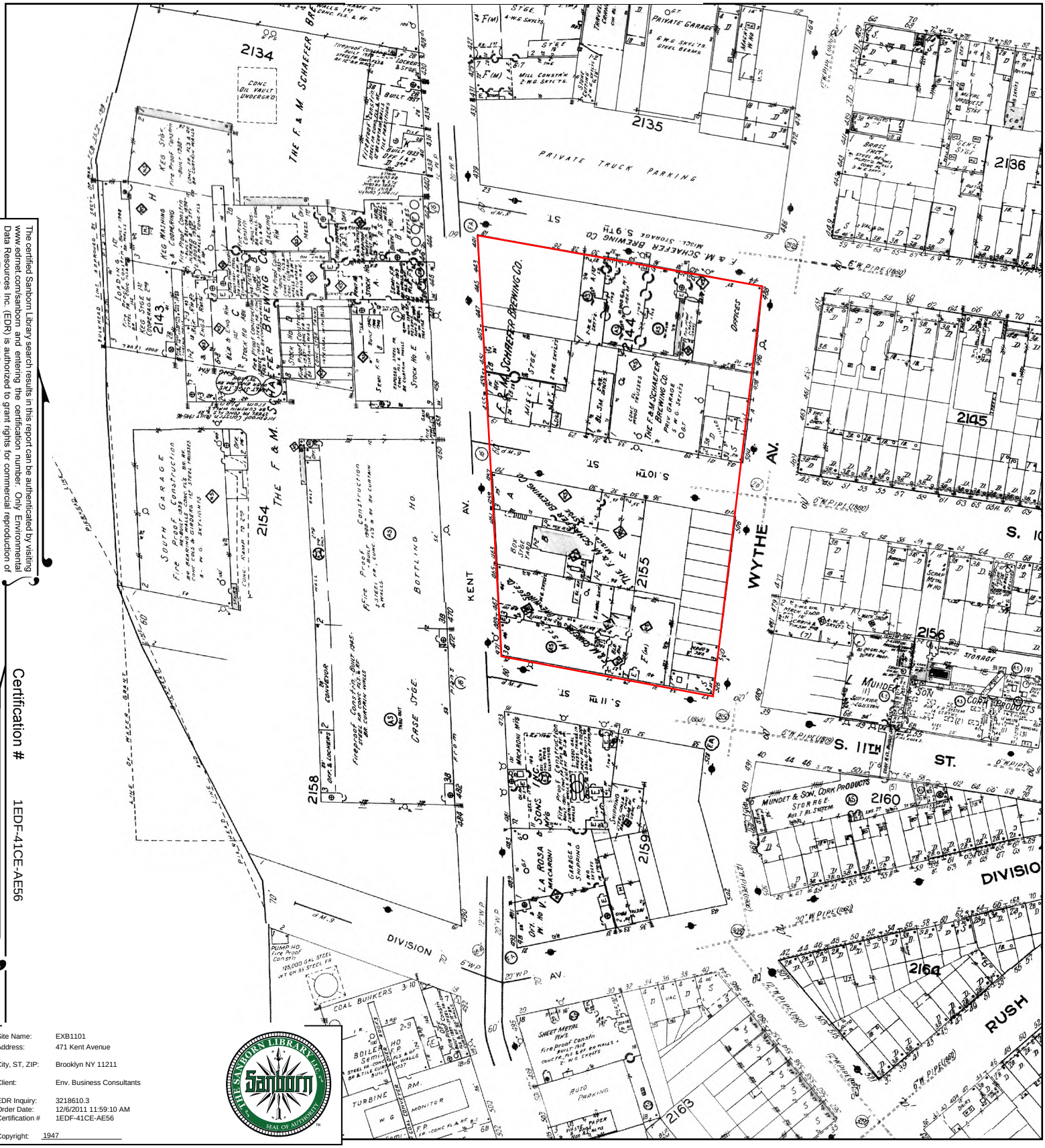
1947 Certified Sanborn Map



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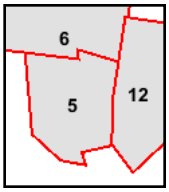

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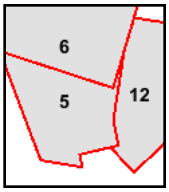

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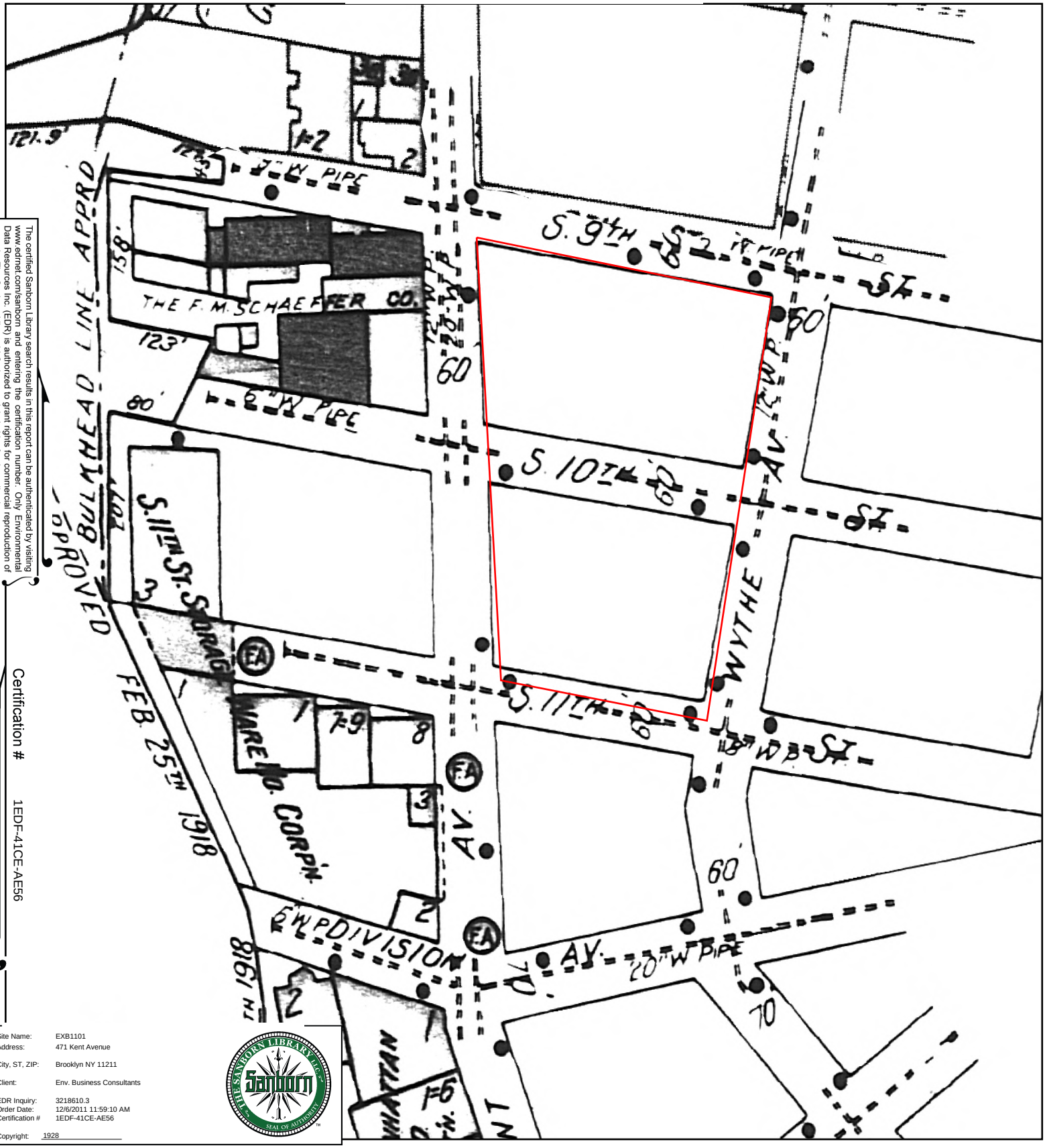
1928 Certified Sanborn Map



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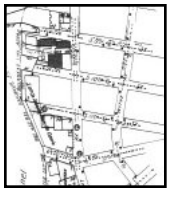

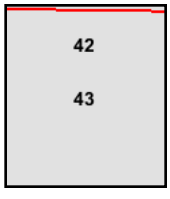

Volume Pier Maps, Sheet 42
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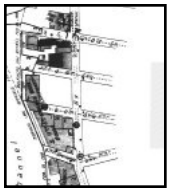

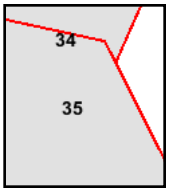

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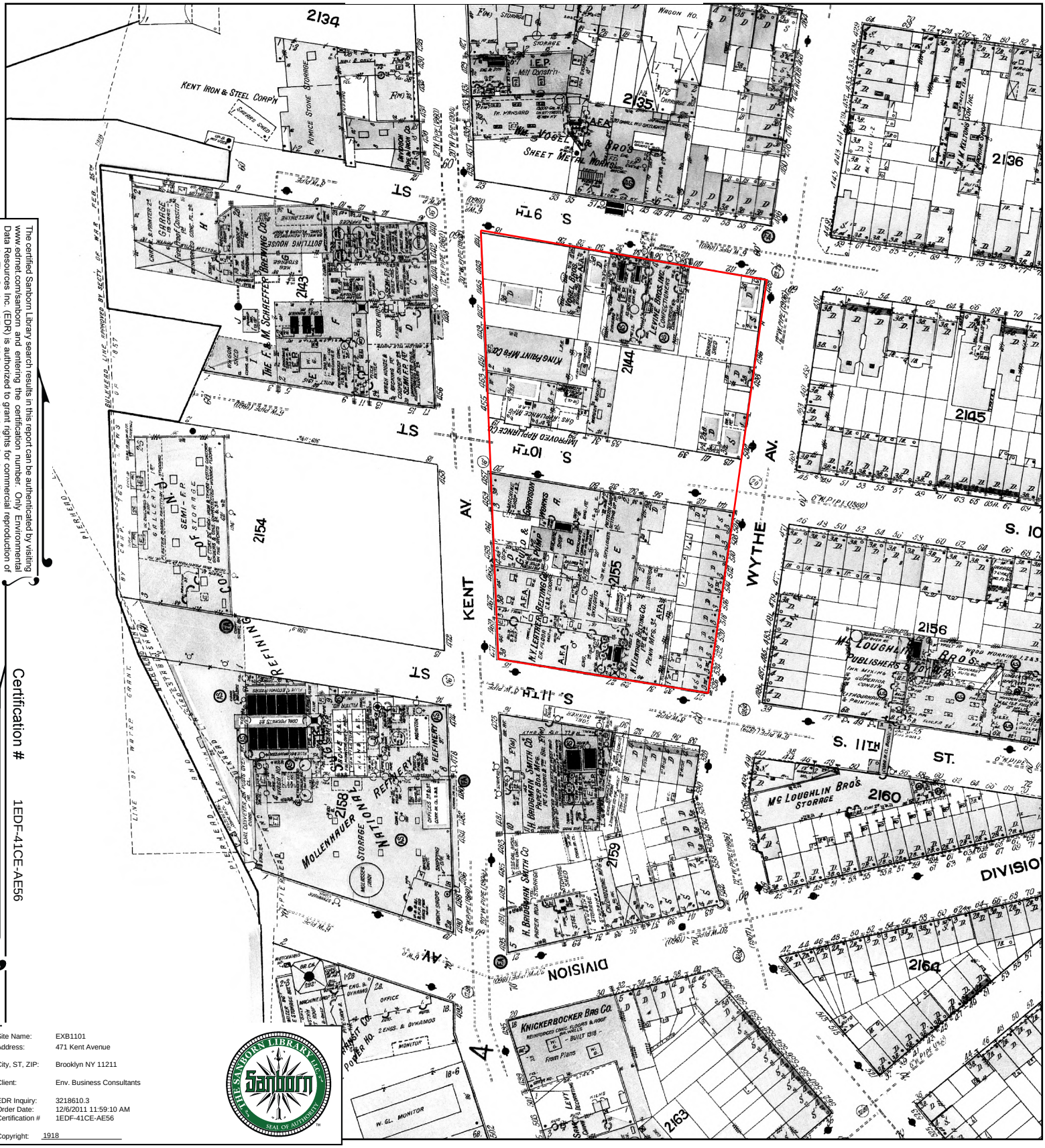

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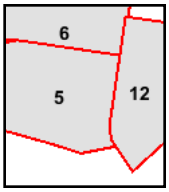

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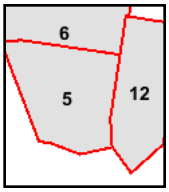

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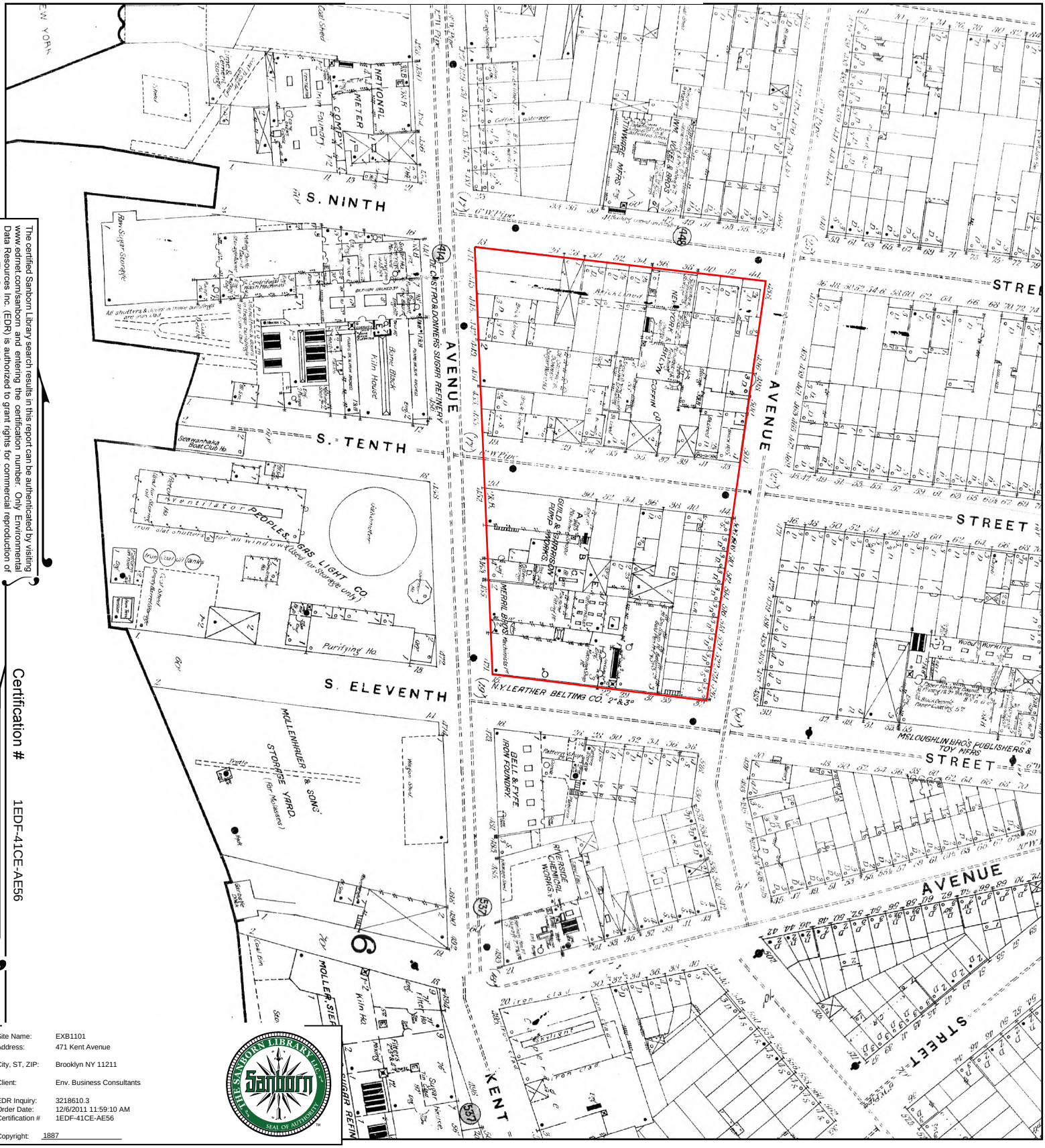
1887 Certified Sanborn Map



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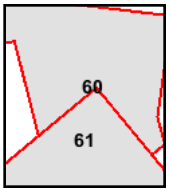

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ATTACHMENT C
Health and Safety Plan

FORMER DOMSEY FIBER CORP. SITE

431 KENT AVENUE
BROOKLYN, NEW YORK
Block 2135 Lot 1
Site No. C-224158

CONSTRUCTION HEALTH AND SAFETY PLAN

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B-12th Floor
625Broadway
Albany, New York 12233

JULY 2012

Program Volunteer:
Wythe and Kent Realty, LLC
144 Spencer Street, Brooklyn, New York 11205

Prepared By:
EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

HEALTH AND SAFETY PLAN

Site:	**Former Domsey Fiber Corp**
Location:	**431 Kent Avenue, Brooklyn, New York**
Prepared By:	**ENVIRONMENTAL BUSINESS CONSULTANTS**
Date Prepared:	**July - 2012**
Version:	**1**
Revision:	**0**
Project Description:	**REMEDIAL ACTION WORK PLAN**
Waste types:	Solid, Liquid
Characteristics:	Volatile Organic Compounds – Gasoline related hydrocarbons
	Volatile Organic Compounds – Chlorinated Hydrocarbons
	Semi-Volatile Organic Compounds – PAHs
	Pesticides - Chlordane
	Heavy Metals
Overall Hazard:	Low to Moderate

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CONSTRUCTION HEALTH AND SAFETY PLAN
Table of Contents

CONSTRUCTION HEALTH AND SAFETY PLAN
Table of Contents Continued

FIGURES

APPENDICES

STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Action planned for 431 Kent Avenue, Brooklyn, New York.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of Remedial Action at the site located 431 Kent Avenue, Brooklyn, NY, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during subsurface investigation activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The CHASP may be revised by EBC at the request of Wythe and Kent Realty, LLC, ("the owner") and/or the New York State Department of Environmental Conservation (NYSDEC) or New York State Department of Health (NYSDOH) upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Scope

This HASP addresses the potential hazards related to the site Remedial Action (RA). The RA activities include three distinct stages as described below:

1) Site mobilization of Demolition Subcontractor (DS);
   a) Demolition, removal and disposal of former Domsey Fiber Corp. buildings;
   b) Site demobilization of DS.

2) Site mobilization of 40HR HAZWOPER trained Environmental Remediation Subcontractor (EnvRS).
   a) Excavate, load and transport for disposal, soil contaminated with chlorinated hydrocarbons and petroleum contamination by EnvRS. Areas that require handling by ERS only, and requires excavation and disposal prior to site access by general site workers are fully described within Remedial Action Plan.
   b) Demobilization of EnvRS

3) Site mobilization of General Subcontractor for excavation of non-chlorinated hydrocarbon impacted soil for construction of buildings' foundations.

1.2 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- EBC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the CHASP. Amendments to the CHASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Construction Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mr. Charles B. Sosik	EBC Principal	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 357-4927
Mr. Joel Braver	Express Builders Construction Supervisor	144 Spencer Street Brooklyn, NY 11205	(718) 625-2000 ext 17
Mr. Kevin Brussee	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 338-1749
Mr. Kevin Waters	EBC Site Safety Officer	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Designating exclusion, decontamination and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

2.0 SITE BACKGROUND AND SCOPE OF WORK

2.1 Location

The address for the Site is 431 Kent Avenue, Brooklyn, New York 11211, and is designated as Block 2135, Lot 1 by the New York City Department of Assessment. The Site is located in the City of New York and Borough of Brooklyn (Kings County). The lot has 237 feet of frontage on South 11th Street, 490 feet on Wythe Avenue, and 498 feet on Kent Avenue for a total area of 135,025 square feet (3.09 acres).

2.2 Current Use

The Site is developed with three buildings as follows:

Two-story brick building - (44 S. 9th Street) - The two-story brick building is located on the southwest corner of the intersection of Wythe Avenue and S. 9th Street. The building was constructed prior to 1935. The building has no basement. The building was vacant, but was finished. Ceiling tiles, walls and flooring were in extremely poor condition and heavily water damaged.

Four-story brick building - (36 to 38 S. 9th Street) - The three-story brick building is adjacent to the two-story brick building, and fronts the northern portion of the lot that was formerly S. 9th Street. The building has a full basement, which is currently empty. The building was constructed prior to 1918. A small open air alleyway is located between the two-story brick building and the four-story brick building. An old transformer shed is located at the rear of the alley.

Warehouse building - The majority of the lot is developed with a one-story concrete block warehouse building that was constructed in 1959. The southern half of the building is currently utilized by Lucky Supplies, which is a warehouse facility that sells plastic food containers. They operate from loading docks that enter/exit from S. 11th Street. The other half of the warehouse building is currently vacant. The northwestern portion of the warehouse building has a second floor which is set up as office space (also vacant).

2.3 Historic Use

Historical information indicates the Site was developed prior to 1887. Historic Sanborn maps note South 10th Street formerly extended through the middle of the Site, which connected Wythe Avenue and Kent Avenue. This created two separate lots, both with buildings that faced South 10th Street. The block created north of South 10th Street was labeled as Block 2144. The block created on the south side of South 10th Street was labeled as Block 2155. A large fire occurred in 1899 which partly destroyed the southern lot (Block 2144), causing damage to the buildings operated by the Merrill Bros. machine shop, the New York Leather Belting Company, the Edward Todd & Company (a gold pen manufacturer), Vogel Bros (a tin shop) and a silver polish manufacturer (Edward F. Davis). Other owners/users of the Site during that time included Guild & Garrison's Steam Pump Works, a blacksmith and the New York & Brooklyn Coffin Company. In the early 1900's, a building formerly utilized for storage of sugar barrels was converted into the King Paint Manufacturing Company, and several buildings at the corner of South 10th Street and Kent Avenue were utilized by the "Improved Appliance Company" which manufactured gas-fired appliances. Sometime between 1918 and 1935, a parking garage building was constructed on the north side of South 10th Street, which contained an underground gas tank.

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By the 1940's, nearly all of the site occupants had been replaced by the F&M Schaeffer Brewing Company, which utilized the older buildings as storage for their brewing operations. The F&M Schaeffer Brewing Company constructed three new large storage buildings on Block 2144 in the late 1940's, and utilized the parking garage on the north side of South 10th Street as a private parking garage (gasoline tank may still be present). The beer facility also began utilizing South 9th Street for miscellaneous storage. In the late 1950's, the F&M Schaeffer Brewing Company combined Blocks 2144 and 2155 into a single lot by constructing a large 1 and 2-story warehouse and office building that extended from South 11th Street to South 9th Street, eliminating South 10th Street. The warehouse building was utilized for storage of packaged goods. The second floor located along the Kent Avenue and South 11th Street street fronts was utilized as office space. Two old buildings on the corner of South 9th Street and Wythe Avenue were not demolished, and continued to be utilized as storage and office space. The F&M Schaeffer Brewing Company closed it's Brooklyn facility in 1976. Tenants of the warehouse and office building since 1976 include the Domsey's Warehouse and Outlet (a used clothing outlet store that operated in the mid 1990's to early 2000's), Brooklyn Sleep Products (used mattresses), and Lucky Supply, Inc. (an aluminum and plastic food storage container distributor and warehouse that still operates the southern half of the warehouse building).

2.4 Prior Investigations

2.4.1 DCES Phase II - 1999

Don Carlo Environmental Services, Inc. (DCES), conducted a Phase II Subsurface Investigation at the subject site and adjacent property to the north (44 South 8th Street) based on the findings of the Phase I performed by EEA, Inc. in 1999. The subsurface investigation consisted of a ground penetrating radar (GPR) survey of the interior of the main warehouse building and the installation of 34 soil borings. Eighteen of the 34 soil borings were performed within the subject site buildings, and the remaining 16 borings were conducted on the adjacent property to the north. No VOCs were detected at an elevated concentration within any of the soil samples, and only relatively low SVOC concentrations (indicative of historic fill) were detected within some of the soil samples. Several metals were detected at elevated concentrations including lead, which was detected at a concentration of 8,288 ppm within the shallow soil sample (0 to 4ft below grade).

2.4.2 EBC Phase I ESA - 2012

A second Phase I Environmental Site Assessment was prepared by EBC in January of 2012, which noted several recognized environmental conditions based on the prior use of the Site. EBC recommended a supplemental Phase II Subsurface Investigation to focus on the areas specifically identified in the Phase I Environmental Site Assessment as areas of concern.

2.4.3 EBC Remedial Investigation - 2012

A two phased remedial investigation was performed by EBC in 2011 and 2012. A total of 50 soil samples were collected from 25 soil borings, 12 groundwater samples were collected from 12 temporary wells, 15 groundwater samples were collected from 11 shallow monitoring wells and 4 deep monitoring wells, 24 soil gas samples were collected from 24 soil gas implants, and four indoor and one outdoor air sample were collected.

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Soil Results

No VOCs were detected above Unrestricted Use SCOs, with the exception of PCE which was detected within just one soil sample at a concentration of 2,000 ppb.

SVOCs were detected above Restricted Residential SCOs in the majority of the soil samples collected from 0 to 2 feet below grade. SVOCs were also detected above Restricted Residential SCOs in two of the soil samples collected from 10 to 12 feet below grade. The highest SVOC concentrations were reported in the same deep soil sample that also reported the PCE concentration of 2,000 ppb. A NYSDEC spill number was assigned due to the elevated SVOCs reported in the soil boring located in the northwest corner of the site. Several soil borings were performed around the soil boring with the elevated PCE and SVOC concentrations to delineate the extent of petroleum and PCE contamination. The zone of impacted soil is limited to less than a 35 foot radius around the ZA-B3 boring (1,500 sf) and to a vertical depth of 15 feet.

Fill materials containing elevated levels of heavy metals were documented throughout the site at a depth which ranged from 2 foot below the building's slab grade in the eastern part of the site to 12 feet below grade along the western side. The increase in fill thickness is likely related to the 10 foot elevation change between Wythe Avenue which borders the property to the east and Kent Avenue which borders the property to the west. With the exception of a few isolated occurrences of individual metals such as chromium, silver, nickel and manganese, native soil beneath the fill largely meets Unrestricted SCOs.

Elevated levels of chromium and nickel were identified in native soil at a depth of 13 to 15 feet below grade in the south central area of the property. Since the metals were reported in native soil as opposed to fill material and since the fill material at this location did not contain elevated levels of these metals, an on-site source related to plating or historic leather dyeing operations was suspected. However, supplemental sampling in this and in other areas of the site with elevated levels of metals indicate that they are isolated occurrences and do not appear to be related to former operations at the site.

Groundwater Results

With the exception of 1,2,4 / 1,3,5-TMB in the MW4D sample there were no Petroleum VOC impacts to groundwater. SVOC parameters were detected in the parts per trillion range across most of the site but appear to be representative of general groundwater quality in the area. There were some SVOC detections at the ZA-GW3 location which do appear to be related to the SVOCs reported in soil at this location. However since the groundwater samples was collected from the same boring as the impacted soil it is likely that the SVOCs in groundwater were the result of the drilling process since elevated SVOCs were not reported in the deeper soil sample from the ZA-B3 location.

CVOC impacts to groundwater were highest near the northeast corner and appear to be migrating in a southwest direction with groundwater flow. The absence of CVOCs in soil in this area and the sitewide distribution site of CVOCs groundwater, suggests an off-site source.

Soil Gas and Indoor Air Results

Total VOC concentrations detected in soil-gas samples collected during the RI were elevated due to high concentrations of ethanol and isopropylalcohol reported in all samples. The origin of

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these alcohols is not known but based on the uniform concentrations and universal presence they are not site related.

Total petroleum related volatile organic compounds were generally low ranging from 24 µg/m^3 in ZBSG3 located near the southwest corner of the lot to 4 µg/m^3 in ZCSG3 located in the west central area of the building. Petroleum VOCs were also low in the indoor air samples ranging from 6 to 27 µg/m^3. The levels reported are consistent with general background concentrations observed throughout the Williamsburg area of Brooklyn.

Chlorinated VOCs (CVOCs) were reported in all soil gas samples at concentrations ranging from from 10 µg/m^3 in ZA-SG1 in the northeast corner of the lot to 19,000 µg/m^3 in PSG8 near the west central property line.

TCE was reported above the maximum sub-slab value of 50 µg/m^3 (above which monitoring is recommended) in eight perimeter locations (PSG2-PSG9) and nine interior soil gas locations (ZBSG1-3, ZCSG1-3, ZDSG1-3). PCE was reported at a maximum sub-slab value of 100 µg/m^3 (above which monitoring is recommended) in five of the perimeter locations only (PSG7-PSG11). PCE and TCE were not reported above air guidance values in any of the indoor air samples. The highest concentration (by an order of magnitude) of PCE in soil gas was the P-SG8 location along the west property line in the southern half of the building (occupied warehouse). The highest concentrations of TCE in soil gas were also in the warehouse building along the east and south property lines. This distribution does not appear to correlate with PCE and TCE distribution in groundwater in which the highest concentrations were reported in the northeast corner of the property. Elevated levels of PCE and TCE were not reported within interior or perimeter soil gas locations within Zone A in the northwest corner of the building where the only detection of PCE in soil was reported. Therefore there also does not appear to be a correlation between PCE contamination in soil and that in soil gas.

In general, both PCE and TCE concentrations were higher in perimeter soil gas samples than they were in soil gas sampling points located within the interior area of the building.

2.5 Redevelopment Plans

Redevelopment plans for the property include the new construction of sixteen 7-story apartment buildings. The buildings will be separated into 4 rows comprised of 4 buildings each. S.10th Street will be extended as a private road with two rows of buildings located north and south of the street. Each row of buildings will front on a street (S.11th, S. 10th and S. 9th). With the exception of S. 10th Street, the entire lot will be excavated to approximately 13 feet below existing grade. Each row of buildings will extend two-thirds back from street frontage with an at grade courtyard area behind each building. The cellar level below the courtyard areas will be utilized as an underground parking garage with ramp access from Kent Avenue. The cellar level below the buildings will be used for utility rooms and storage.

2.6 Description of Remedial Action

Site activities included within the Remedial Action that are included within the scope of this HASP include the following:

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1. Removal of petroleum and CVOC impacted soil from an approximate 1,500 sf area in the northwest corner of the property.
2. Removal of chromium, silver, nickel and manganese impacted soils from several isolated areas at the site.
3. Excavation of soil/fill exceeding Track 1 SCOs listed in Table 1; Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
4. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 1 SCOs;
5. 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;
6. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Table 1, (2) all Federal, State and local rules and regulations for handling and transport of material.

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3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

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3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
    c. Heat Stroke
        Cause: Same as heat exhaustion. This is also an extremely serious condition.
        Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.
        Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

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3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

Soil, groundwater and soil gas samples collected from the site as part of several subsurface investigations performed at the site have revealed significant concentrations of volatile organic compounds associated with both petroleum volatile organic compounds (PVOCs) and chlorinated organic compounds (CVOCs), as well as elevated levels of semi-volatile organic compounds (SVOCs) and metals.

Volatile organic compounds reported to be present in soil, soil gas and/or groundwater include the following:

1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Chloroform	Trichloroethene (TCE)
Tetrachloroethene (PCE)			

Semi-Volatile organic compounds reported to be present soil, soil gas and/or groundwater include the following:

Benzo(a)anthracene	Phenanthrene	Benzo(b)fluoranthene	Acenaphthylene
Benzo(g,h,i)perylene	Pyrene	Indeno(1,2,3-cd)pyrene	Benzo(a)pyrene
Benzo(k)fluoranthene	Chrysene	Acenaphthene	Fluorene
Dibenzo(a,h)anthracene	Fluoranthene	Bis(2-ethylhexyl)phthalate	Naphthalene

Metals reported to be present soil, and/or groundwater include the following

Arsenic	Barium	Beryllium	Cadmium
Calcium	Chromium	Copper	Iron
Lead	Manganese	Magnesium	Mercury
Nickel	Sodium	Silver	Zinc

Pesticides reported to be present in soil include the following

Chlordane

The VOCs and SVOCs detected within the soil, soil gas and/or groundwater are likely associated with former drycleaning operations that were conducted at the site. Chlorinated solvents such as PCE were utilized in the possibly in the 1980's and 1990's within a dry cleaning machine that was used on the second floor.

Chlorinated hydrocarbon (PCE, TCE) contamination of groundwater has been determined to be nearly site wide. A single area was found to have much higher CVOC concentrations in soil

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compared to the rest of the Site. This hot spot area is located near the former northwestern Domsey loading bays. The same soil sample that contained the high CVOC concentration also contained evidence of petroleum contamination (high SVOCs). A NYSDEC spill number has been assigned due to the elevated concentrations.

The primary routes of exposure to identified contaminants in soil, soil gas and groundwater to on-site investigation and remediation workers is through inhalation, ingestion and absorption.

Appendix C includes information sheets for the known and suspected chemicals that may be encountered at the site.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

Elevated levels of VOCs were detected in both soil and groundwater samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

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4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work clothes, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when sustained concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), by more than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the

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intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection, engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of excavations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

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5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue excavating • Level D protection • Continue monitoring every 10 minutes

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1-5 ppm Above Background, Sustained Reading	1-10%	• Continue excavating • Go to Level C protection or employ engineering controls • Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustaineed Reading	10-20%	• Discontinue excavating, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at excavation pit
>25 ppm Above Background, Sustained Reading	>20%	• Discontinue excavating • Withdraw from area, shut off all engine ignition sources. • Allow pit to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).

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6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

It is expected that an exclusion zone, decontamination zone, and support zone will only be established during the remedial work required to excavate the CVOC and petroleum hotspot area. A licensed Environmental Contractor with relative hazardous material handling experience and training is required to perform any soil disturbing activities within the hotspots identified within the Remedial Action Work Plan. All onsite workers must provide evidence of OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

6.1 General Site Work

Upon completion of CVOC hotspot remedial activities by an Environmental Contractor, a general excavation contractor may continue with site excavation/grading as needed for basement excavation, shoring, other building requirements, or as necessary to excavate petroleum related VOC contaminated soil as deemed necessary by the Remedial Action Work Plan and/or Project Manager. All onsite employees must have obtained OSHA 24-hour Hazardous Waste Operations and Emergency Response Operations training prior to performing soil disturbing activities.

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7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
Suffolk County Police	911
NYC Fire Department	911
Jamaica Hospital Medical Center	(718) 206-6000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4909
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

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Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Mr. Kevin Brussee (631) 504-6000
- Construction Superintendent — Mr. Joel Braver (718) 625-2000 ext 17
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.

- Exit through the decontamination corridor if possible.

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- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

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Fax 631.924.2870

APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

_____

_____

_____

Alternative Procedures: _____

_____

_____

_____

Required Changes in PPE: _____

_____

_____

_____

_____ _____

Project Superintendent (signature) **Date**

_____ _____

Health and Safety Consultant (signature) **Date**

_____ _____

Site Safety Officer (signature) **Date**

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

Pseudocumene

C_9H_{12}

Molecular mass: 120,2

ICSC # 1433
CAS # 95-63-6
RTECS # DC3325000
UN # 1993
EC # 601-043-00-3
March 06, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 44°C explosive vapour/air mixtures may be formed.	Above 44°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Xn symbol N symbol R: 10-20-36/37/38-51/53 S: 2-26-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1433

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

1,2,4-TRIMETHYLBENZENE

ICSC: 1433

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as mixed isomers) 25 ppm as TWA (ACGIH 2004). MAK: (as mixed isomers) 20 ppm 100 mg/m³ Peak limitation category: II(2) Pregnancy risk group: C (DFG 2004). OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure , resulting in chronic bronchitis The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 169°C Melting point: -44°C Relative density (water = 1): 0.88 Solubility in water: very poor Relative vapour density (air = 1): 4.1	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 44°C c.c. Auto-ignition temperature: 500°C Explosive limits, vol% in air: 0.9-6.4 Octanol/water partition coefficient as log Pow: 3.8
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. See also ICSC 1155 1,3,5-Trimethylbenzene (Mesitylene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers). 1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

Transport Emergency Card: TEC (R)-30GF1-III
NFPA Code: H0; F2; R0;

ADDITIONAL INFORMATION

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International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

Mesitylene
C_9H_{12}
Molecular mass: 120.2

ICSC # 1155
CAS # 108-67-8
RTECS # OX6825000
UN # 2325
EC # 601-025-00-5
March 06, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
EXPLOSION	Above 50°C explosive vapour/air mixtures may be formed.	Above 50°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
•INHALATION	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness. Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Marine pollutant. Xi symbol N symbol R: 10-37-51/53 S: 2-61 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

1,3,5-TRIMETHYLBENZENE

ICSC: 1155

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on burning producing toxic and irritating fumes. Reacts violently with strong oxidants causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV (as mixed isomers): 25 ppm; (ACGIH 2001). MAK (all isomers): 20 ppm; 100 mg/m^3; class II 1 © (2001) OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m^3) NIOSH IDLH: N.D. See: IDLH INDEX	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure, resulting in chronic bronchitis. The substance may have effects on the central nervous system blood See Notes.
PHYSICAL PROPERTIES	Boiling point: 165°C Melting point: -45°C Relative density (water = 1): 0.86 Solubility in water: very poor Vapour pressure, kPa at 20°C: 0.25	Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 50°C (c.c.) Auto-ignition temperature: 550°C Octanol/water partition coefficient as log Pow: 3.42
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. See ICSC 1433 1,2,4-Trimethylbenzene (Pseudocumene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethyl benzene (mixed isomers).

Transport Emergency Card: TEC (R)-30S2325
NFPA Code: H0; F2; R0

ADDITIONAL INFORMATION

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International Chemical Safety Cards

CHLOROFORM

ICSC: 0027

Trichloromethane
Methane trichloride
Formyl trichloride
$CHCl_3$
Molecular mass: 119.4

ICSC # 0027
CAS # 67-66-3
RTECS # FS9100000
UN # 1888
EC # 602-006-00-4
November 04, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. See Notes. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
•INHALATION	Cough. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness. Pain. Dry skin.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness. Pain.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.	Separated from food and feedstuffs and incompatible materials ,(see Chemical Dangers). Ventilation along the floor.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Xn symbol R: 22-38-40-48/20/22 S: 2-36/37 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the

ICSC: 0027

European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHLOROFORM

ICSC: 0027

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
VOLATILE COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride ICSC0163,phosgene ICSC0007 andchlorine fumes ICSC0126). Reacts violently withstrong bases,strong oxidants, some metals, such as aluminium, magnesium and zinc, causing fire and explosion hazard. Attacks plastic, rubber and coatings.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004).
MAK: 0.5 ppm, 2.5 mg/m³;
Peak limitation category: II(2);
skin absorption (H);
Carcinogen category: 4; Pregnancy risk group: C;
(DFG 2004).
OSHA PEL†: C 50 ppm (240 mg/m^3)
NIOSH REL: Ca ST 2 ppm (9.78 mg/m^3) 60-minute See Appendix A
NIOSH IDLH: Ca 500 ppm See: 67663

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes . The substance may cause effects on the central nervous system , liver and kidneys . The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the liver and kidneys . This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 62°C
Melting point: -64°C
Relative density (water = 1): 1.48
Solubility in water, g/100 ml at 20°C: 0.8

Vapour pressure, kPa at 20°C: 21.2
Relative vapour density (air = 1): 4.12
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.7
Octanol/water partition coefficient as log Pow: 1.97

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

N O T E S

Turns combustible on addition of small amounts of a flammable substance or an increase in the oxygen content of the air. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1888

NFPA Code: H 2; F 0; R 0;

ADDITIONAL INFORMATION

ICSC: 0027 **CHLOROFORM**

(C) IPCS, CEC, 1994

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
C_2Cl_4 / $Cl_2C=CCl_2$
Molecular mass: 165.8

ICSC # 0076
CAS # 127-18-4
RTECS # KX3850000
UN # 1897
EC # 602-028-00-4
April 13, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles , face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,(see Chemical Dangers), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0076

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
NIOSH IDLH: Ca 150 ppm See: 127184

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.9

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
C_2HCl_3 / $ClCH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # KX4550000
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION		Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the

ICSC: 0081 OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene , hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)
NIOSH REL: Ca See Appendix A See Appendix C
NIOSH IDLH: Ca 1000 ppm See: 79016

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42
Electrical conductivity: 800pS/m

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

N O T E S

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;
Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.
Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

ADDITIONAL INFORMATION

International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

1,2-Dihydroacenaphthylene
1,8-Ethylenenaphthalene
$C_{12}H_{10}$
Molecular mass: 154.2

ICSC # 1674
CAS # 83-32-9
RTECS # AB1000000
UN # 3077
October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See NOTES.	PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P2 filter respirator for harmful particles. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants . Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	UN Hazard Class: 9 UN Packing Group: III Signal: Warning Enviro Very toxic to aquatic life with long lasting effects

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1674

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International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE TO BEIGE CRYSTALS

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On combustion, forms toxic gases including carbon monoxide. Reacts with strong oxidants .

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed .

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
See Notes.

PHYSICAL PROPERTIES

Boiling point: 279°C
Melting point: 95°C
Density: 1.2
g/cm³
Solubility in water, g/100 ml at 25°C: 0.0004

Vapour pressure, Pa at 25°C: 0.3
Relative vapour density (air = 1): 5.3
Flash point: 135°C o.c.
Auto-ignition temperature: >450 °C
Octanol/water partition coefficient as log Pow: 3.9 - 4.5

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised that this substance does not enter the environment.

NOTES

Acenaphthene occurs as a pure substance and also as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

Transport Emergency Card: TEC (R)-90GM7-III

ADDITIONAL INFORMATION

International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

Anthracin
Paranaphthalene
$C_{14}H_{10}$ / $(C_6H_4CH)_2$
Molecular mass: 178.2

ICSC # 0825
CAS # 120-12-7
RTECS # CA9350000
March 24, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Sore throat.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain.	Do not eat, drink, or smoke during work.	Rinse mouth. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from strong oxidants. Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0825

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International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

I **M**	**PHYSICAL STATE; APPEARANCE:** WHITE CRYSTALS OR FLAKES.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by

P O R T A N T D A T A	**PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** The substance decomposes on heating, under influence of strong oxidants producing acrid, toxic fume , causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. inhalation. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance slightly irritates the skin and the respiratory tract. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis under the influence of UV light.
PHYSICAL PROPERTIES	Boiling point: 342°C Melting point: 218°C Density: 1.25-1.28 g/cm3 Solubility in water, g/100 ml at 20 °C: 0.00013 Vapour pressure, Pa at 25°C: 0.08 Relative vapour density (air = 1): 6.15 Flash point: 121°C Auto-ignition temperature: 538°C Explosive limits, vol% in air: 0.6-? Octanol/water partition coefficient as log Pow: 4.5 (calculated)
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. 

N O T E S

Green oil, Tetra-olive N2G are trade names.

NFPA Code: H0; F1; R;

ADDITIONAL INFORMATION

ICSC: 0825 **ANTHRACENE**

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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # CV9275000
EC # 601-033-00-9
October 23, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

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International Chemical Safety Cards

ICSC: 0385

BENZ(a)ANTHRACENE

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK:
Carcinogen category: 2 (as pyrolysis product of organic materials)
(DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Sublimation point: 435°C
Melting point: 162°C
Relative density (water = 1): 1.274
Solubility in water:
none

Vapour pressure, Pa at 20°C: 292
Octanol/water partition coefficient as log Pow: 5.61

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

N O T E S

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

ICSC: 0385 **BENZ(a)ANTHRACENE**

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0104
CAS # 50-32-8
RTECS # DJ3675000
EC # 601-032-00-3
October 17, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK:
Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496°C
Melting point: 178.1°C
Density: 1.4
g/cm³

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure :
negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

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International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0720
CAS # 205-99-2
RTECS # CU1400000
EC # 601-034-00-4
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

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International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I	**PHYSICAL STATE; APPEARANCE:** COLOURLESS CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation

IMPORTANT DATA	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2; (DFG 2004). of its aerosol and through the skin. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans. May cause genetic damage in humans.
PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.12
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. 

N O T E S

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0720 **BENZO(b)FLUORANTHENE**

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International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527

2,13-Benzofluoranthene
Benzo(mno)fluoranthene
$C_{18}H_{10}$
Molecular mass: 226.3

ICSC # 0527
CAS # 203-12-3
RTECS # DF6140000
March 25, 1998 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
•EYES		Safety goggles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0527

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International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527

I **M** **P**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

O R T A N T D A T A	**CHEMICAL DANGERS:** The substance decomposes on heating producing toxic fumes. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	**INHALATION RISK:** **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** See Notes.
PHYSICAL PROPERTIES	Melting point: 149°C Solubility in water: none Vapour pressure, Pa at 20°C: <10	Relative vapour density (air = 1): 7.8 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.0 Octanol/water partition coefficient as log Pow: 7.23
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats. 	

N O T E S

Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Also consult ICSC #0720 and 0721.

ADDITIONAL INFORMATION

ICSC: 0527 **BENZO(g,h,i)FLUORANTHENE**

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International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0721
CAS # 207-08-9
RTECS # DF6350000
EC # 601-036-00-5
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004). **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 217°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish. 

N O T E S

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0721 **BENZO(k)FLUORANTHENE**

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International Chemical Safety Cards

DI(2-ETHYLHEXYL) PHTHALATE

ICSC: 0271

Dioctylphthalate
DOP; DEHP
Bis-(2-ethylhexyl)phthalate
$C_{24}H_{38}O_4$ / $C_6H_4(COOC_8H_{17})_2$
Molecular mass: 390.6

ICSC # 0271
CAS # 117-81-7
RTECS # TI0350000
EC # 607-317-00-9
October 18, 2001 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
•INHALATION	Cough. Sore throat.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal cramps. Diarrhoea. Nausea.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Chemical protection suit.	Separated from strong oxidants, acids, alkalis, and nitrates. Cool. Dry. Well closed.	T symbol R: 60-61 S: 53-45

SEE IMPORTANT INFORMATION ON BACK

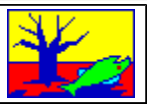
ICSC: 0271

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DI(2-ETHYLHEXYL) PHTHALATE

ICSC: 0271

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS TO LIGHT COLOURED VISCOUS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating producing irritating fumes . Reacts with strong oxidants acids alkalis and nitrates **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 5 mg/m³; < A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004). MAK: 10 mg/m³; Peak limitation category: II(8); Carcinogen category: 4; Pregnancy risk group: C; (DFG 2004). OSHA PEL†: TWA 5 mg/m^3 NIOSH REL: Ca TWA 5 mg/m^3 ST 10 mg/m^3 See Appendix A NIOSH IDLH: Ca 5000 mg/m^3 See: 117817 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes and the respiratory tract . **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the testes. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 385°C Melting point: -50°C Relative density (water = 1): 0.986 Solubility in water: none Vapour pressure, kPa at 20°C: 0.001 Relative vapour density (air = 1): 13.45 Flash point: 215°C o.c. Auto-ignition temperature: 350°C Octanol/water partition coefficient as log Pow: 5.03
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood. 

N O T E S

Card has been partly updated in October 2005. See section Occupational Exposure Limits.

NFPA Code: H 0; F 1; R 0

ADDITIONAL INFORMATION

ICSC: 0271 **DI(2-ETHYLHEXYL) PHTHALATE**

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International Chemical Safety Cards

CHRYSENE

ICSC: 1672

Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # GC0700000
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Aqua-Cancer Suspected of causing cancer Very toxic to aquatic life with long lasting effects Very toxic to aquatic life

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European

Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO BEIGE CRYSTALS OR POWDER

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006).
MAK not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 448°C
Melting point: 254 - 256°C
Density: 1.3 g/cm³

Solubility in water:
very poor
Octanol/water partition coefficient as log Pow: 5.9

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

1,25,6-Dibenzanthracene
$C_{22}H_{14}$
Molecular mass: 278.4

ICSC # 0431
CAS # 53-70-3
RTECS # HN2625000
EC # 601-041-00-2
October 23, 1995 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0431

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

I

M

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O

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALLINE POWDER.

PHYSICAL DANGERS:

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration

R T A N T D A T A	**CHEMICAL DANGERS:** **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the skin , resulting in photosensitization. This substance is probably carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 524°C Melting point: 267°C Relative density (water = 1): 1.28	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.5
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood. 	

N O T E S

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH).

ADDITIONAL INFORMATION

ICSC: 0431 **DIBENZO(a,h)ANTHRACENE**

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Material Safety Data Sheet

Version 4.2
Revision Date 05/19/2011
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Fluoranthene
Product Number	:	423947
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Carcinogen

GHS Classification
Acute toxicity, Oral (Category 4)
Acute toxicity, Dermal (Category 5)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H313	May be harmful in contact with skin.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Benzo[*j*,*k*]fluorene

Formula : $C_{16}H_{10}$

Molecular Weight : 202.25 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluoranthene			
206-44-0	205-912-4	-	-

4. FIRST AID MEASURES

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

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

In case of skin contact
Wash off with soap and plenty of water. 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.

5. FIRE-FIGHTING MEASURES

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

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

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.

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.

7. HANDLING AND STORAGE

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. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand 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.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and 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.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 105 - 110 °C (221 - 230 °F) - lit.
Boiling point	384 °C (723 °F) - lit.
Flash point	198.0 °C (388.4 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 2,000 mg/kg

Inhalation LC50
no data available

Dermal LD50
LD50 Dermal - rabbit - 3,180 mg/kg

Other information on acute toxicity
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
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluoranthene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be human carcinogens. (Fluoranthene)
	Reasonably anticipated to be a human carcinogen (Fluoranthene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

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

Synergistic effects
no data available

Additional Information
RTECS: LL4025000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.0077 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 560 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 - < 0.01 mg/l - 3 d
	Immobilization EC50 - Daphnia magna (Water flea) - 0.78 mg/l - 20 h
	NOEC - Daphnia magna (Water flea) - 0.085 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

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

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Fluoranthene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Harmful by ingestion., Carcinogen

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

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

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

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Fluoranthene	206-44-0	1990-01-01

16. OTHER INFORMATION

Further information
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Material Safety Data Sheet

Version 3.1
Revision Date 10/15/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Fluorene

Product Number : 46880
Brand : Aldrich
Product Use : For laboratory research purposes.

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

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

GHS Classification
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification
Health hazard: 1
Flammability: 1
Physical hazards: 0

NFPA Rating
Health hazard: 1
Fire: 1
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{13}H_{10}$
Molecular Weight : 166.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluorene			
86-73-7	201-695-5	-	-

4. 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. 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.

5. FIRE-FIGHTING MEASURES

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

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

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.

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.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand 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.

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

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	white

Safety data

pH	no data available
Melting/freezing point	Melting point/range: 113 - 115 °C (235 - 239 °F)
	Melting point/range: 111 - 114 °C (232 - 237 °F) - lit.
Boiling point	298 °C (568 °F) - lit.
Flash point	151.0 °C (303.8 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - > 2.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluorene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be 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
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: LL5670000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Fish - 0.82 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Remarks: no data available
Toxicity to algae	EC50 - Algae - 3.4 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 512

Mobility in soil
Adsorbs on soil.

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluorene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluorene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

DSL Status
All components of this product are on the Canadian DSL list.

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

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

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
Copyright 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

o-Phenylenepyrene
2,3-Phenylenepyrene
$C_{22}H_{12}$
Molecular mass: 276.3

ICSC # 0730
CAS # 193-39-5
RTECS # NK9300000
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

I **M** **P**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin. **INHALATION RISK:**

O R T A N T D A T A	**CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004).	Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 536°C Melting point: 164°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.58
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0730 **INDENO(1,2,3-cd)PYRENE**

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE: Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667

Naphthene
$C_{10}H_8$
Molecular mass: 128.18

ICSC # 0667
CAS # 91-20-3
RTECS # QJ0525000
UN # 1334 (solid); 2304 (molten)
EC # 601-052-00-2
April 21, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 80°C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 22-40-50/53 S: 2-36/37-46-60-61 UN Hazard Class: 4.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On combustion, forms irritating and toxic gases. Reacts with strong oxidants

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm as TWA 15 ppm as STEL (skin) A4 (not classifiable as a human carcinogen); (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004).
OSHA PEL†: TWA 10 ppm (50 mg/m^3)
NIOSH REL: TWA 10 ppm (50 mg/m^3) ST 15 ppm (75 mg/m^3)
NIOSH IDLH: 250 ppm See: 91203

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 218°C
Sublimation slowly at room temperature
Melting point: 80°C
Density: 1.16
g/cm3
Solubility in water, g/100 ml at 25°C:
none

Vapour pressure, Pa at 25°C: 11
Relative vapour density (air = 1): 4.42
Flash point:
80°C c.c.
Auto-ignition temperature: 540°C
Explosive limits, vol% in air: 0.9-5.9
Octanol/water partition coefficient as log Pow: 3.3

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

N O T E S

Some individuals may be more sensitive to the effect of naphthalene on blood cells.

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)
NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Phenanthrene
Product Number	:	695114
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Irritant

Other hazards which do not result in classification
Photosensitizer.

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.

Eyes	Causes eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{10}$
Molecular Weight : 178.23 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Phenanthrene			
85-01-8	201-581-5	-	-

4. FIRST AID MEASURES

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

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

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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

5. FIRE-FIGHTING MEASURES

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

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

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.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

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. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Phenanthrene	85-01-8	TWA	0.2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses with side-shields conforming to EN166

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	98 - 100 °C (208 - 212 °F)
Boiling point	340 °C (644 °F)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.063 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.57

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - mouse - 700.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Phenanthrene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

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

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 3.2 mg/l - 96.0 h
	LC100 - other fish - 1.5 mg/l - 1.0 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 0.86 mg/l - 24 h

and other aquatic invertebrates.

EC50 - Daphnia magna (Water flea) - 0.38 mg/l - 48 h

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 1.20 mg/l - 3 h

Persistence and degradability

Biodegradability Result: 55 - 95 % - Partially biodegradable.

Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 28 d
Bioconcentration factor (BCF): 5,100

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Phenanthrene)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Phenanthrene)
Marine pollutant: No

IATA

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards

Harmful by ingestion., Irritant

DSL Status

All components of this product are on the Canadian DSL list.

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

SARA 313 Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Phenanthrene	85-01-8	1990-01-01

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 Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

PYRENE

ICSC: 1474

Benzo (d,e,f) phenanthrene
beta-Pyrene
$C_{16}H_{10}$
Molecular mass: 202.26

ICSC # 1474
CAS # 129-00-0
RTECS # UR2450000
November 27, 2003 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1474

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

PYRENE

ICSC: 1474

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW COLOURLESS SOLID IN VARIOUS FORMS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation through the skin and by ingestion

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating producing irritating fumes **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK not established. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

PHYSICAL PROPERTIES	Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm3	Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in crustacea,in fish,in milk,in algae andin molluscs. It is strongly advised that this substance does not enter the environment. 	

N O T E S

Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.

ADDITIONAL INFORMATION

ICSC: 1474 **PYRENE**

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

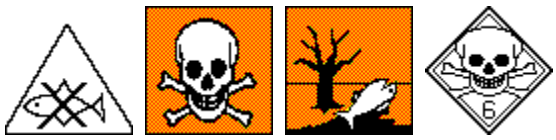
International Chemical Safety Cards

ARSENIC

ICSC: 0013

Grey arsenic
As
Atomic mass: 74.9

ICSC # 0013
CAS # 7440-38-2
RTECS # CG0525000
UN # 1558
EC # 033-001-00-X
October 18, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.	Do not transport with food and feedstuffs. Marine pollutant. T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0013

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ARSENIC

ICSC: 0013

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.01 mg/m³ as TWA A1 (confirmed human carcinogen); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).
OSHA PEL: 1910.1018 TWA 0.010 mg/m^3
NIOSH REL: Ca C 0.002 mg/m^3 15-minute See Appendix A
NIOSH IDLH: Ca 5 mg/m^3 (as As) See: 7440382

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract cardiovascular system central nervous system kidneys , resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system liver bone marrow , resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Sublimation point: 613°C
Density: 5.7 g/cm³

Solubility in water:
none

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.

N O T E S

The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).

Transport Emergency Card: TEC (R)-61GT5-II

ADDITIONAL INFORMATION

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International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

Barium sulphate
Blanc fixe
Artificial barite
$BaSO_4$
Molecular mass: 233.43

ICSC # 0827
CAS # 7727-43-7
RTECS # CR0600000
October 20, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0827

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Reacts violently with aluminium powder. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 10 mg/m³ as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m³; (Respirable fraction) 1.5 mg/m³; (DFG 2004). OSHA PEL†: TWA 15 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH REL: TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH IDLH: N.D. See: IDLH INDEX **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol. **INHALATION RISK:** Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Lungs may be affected by repeated or prolonged exposure to dust particles , resulting in baritosis (a form of benign pneumoconiosis).
PHYSICAL PROPERTIES	Melting point (decomposes): 1600°C Density: 4.5 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

NOTES

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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International Chemical Safety Cards

BERYLLIUM

ICSC: 0226

Glucinium
Be
Atomic mass: 9.0

ICSC # 0226
CAS # 7440-41-7
RTECS # DS1750000
UN # 1567
EC # 004-001-00-7
October 20, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Shortness of breath. Sore throat. Weakness. Symptoms may be delayed (see Notes).	Local exhaust. Breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Carefully collect the spilled substance into containers; if appropriate moisten first, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	Separated from strong acids, bases food and feedstuffs	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: E T+ symbol R: 49-25-26-36/37/38-43-48/23 S: 53-45 UN Hazard Class: 6.1 UN Subsidiary Risks: 4.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0226

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BERYLLIUM

ICSC: 0226

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
GREY TO WHITE POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts with strong acids and strong bases forming flammable/explosive gas (hydrogen - see ICSC0001) Forms shock sensitive mixtures with some chlorinated solvents, such as carbon tetrachloride and trichloroethylene.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.002 mg/m³ as TWA 0.01 mg/m³ as STEL A1 (confirmed human carcinogen); (ACGIH 2004).
Intended change 0.00002 mg/m³
Skin, Inhal.
SEN (ACGIH 2005).
MAK: sensitization of respiratory tract and skin (Sah);
Carcinogen category: 1;
(DFG 2004).
OSHA PEL: TWA 0.002 mg/m^3 C 0.005 mg/m^3 0.025 mg/m^3 30-minute maximum peak
NIOSH REL: Ca Not to exceed 0.0005 mg/m^3 See Appendix A
NIOSH IDLH: Ca 4 mg/m^3 (as Be) See: IDLH INDEX

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
The aerosol of this substance is irritating to the respiratory tract Inhalation of dust or fumes may cause chemical pneumonitis. Exposure may result in death. The effects may be delayed. Medical observation is indicated.

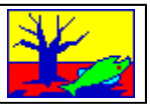
EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact may cause skin sensitization. Lungs may be affected by repeated or prolonged exposure to dust particles , resulting in chronic beryllium disease (cough, weight loss, weakness). This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: above 2500°C
Melting point: 1287°C
Density: 1.9 g/cm³
Solubility in water: none

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms.



N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-61GTF3-II
NFPA Code: H3; F1; R0

ADDITIONAL INFORMATION

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International Chemical Safety Cards

CADMIUM

ICSC: 0020

Cd
Atomic mass: 112.4

ICSC # 0020
CAS # 7440-43-9
RTECS # EU9800000
UN # 2570
EC # 048-002-00-0
April 22, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s).	Dry sand. Special powder. NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•**INHALATION**	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•**SKIN**		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•**EYES**	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•**INGESTION**	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place.	Fireproof. Dry. Keep under inert gas. Separated from igntion sources, oxidants acids, food and feedstuffs	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: E T+ symbol N symbol R: 45-26-48/23/25-62-63-68-50/53 S: 53-45-60-61 UN Hazard Class: 6.1

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0020

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CADMIUM

ICSC: 0020

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001.) Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium , causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: (Total dust) 0.01 mg/m³
(Respirable fraction)
0.002 mg/m³ as TWA A2 (suspected human carcinogen); BEI issued (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).
OSHA PEL*: 1910.1027 TWA 0.005 mg/m^3 *Note: The PEL applies to all Cadmium compounds (as Cd).
NIOSH REL*: Ca See Appendix A *Note: The REL applies to all Cadmium compounds (as Cd).
NIOSH IDLH: Ca 9 mg/m^3 (as Cd) See: IDLH INDEX

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:
The fume is irritating to the respiratory tract Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys , resulting in kidney impairment This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 765°C
Melting point: 321°C
Density: 8.6
g/cm3

Solubility in water: none
Auto-ignition temperature: (cadmium metal dust) 250°C

ENVIRONMENTAL DATA

N O T E S

Reacts violently with fire extinguishing agents such as water,foam,carbon dioxideand halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home. Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

CALCIUM

ICSC: 1192

Elemental Calcium
Ca

ICSC # 1192
CAS # 7440-70-2
RTECS # EV8040000
UN # 1401; 1855 (calcium pyrophoric)
EC # 020-001-00-X
October 24, 1994 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible but forms flammable gas on contact with water or damp air. Highly flammable when finely divided. Forms flammable gas on contact with water or damp air. Many reactions may cause fire or explosion.	NO open flames, NO sparks, and NO smoking. NO contact with water and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Risk of fire and explosion on contact with water and incompatible substances (see Chemical Dangers).		In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Avoid inhalation of fine dust and mist.	Fresh air, rest. Refer for medical attention.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. Sweep spilled substance into containers. Do NOT wash away into sewer. Carefully collect remainder, then remove to safe place. Do NOT absorb in saw-dust or other combustible absorbents. (Extra personal protection: complete protective clothing including self-contained breathing apparatus).	Fireproof. Separated from incompatible substances (see Chemical Dangers). Dry. Keep under inert gas. Keep under petroleum oil.	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. F symbol R: 15 S: 2-8-24/25-43 UN Hazard Class: 4.3; 4.2 (calcium pyrophoric) UN Packing Group: II; I (calcium pyrophoric)

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1192

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CALCIUM

ICSC: 1192

IMPORTANT DATA		
	PHYSICAL STATE; APPEARANCE: LUSTROUS SILVER WHITE METAL (WHEN FRESHLY CUT); TURNS BLUISH GREY ON EXPOSURE TO MOIST AIR. **PHYSICAL DANGERS:** Ignites in air when finely divided. **CHEMICAL DANGERS:** Reacts with water, alcohol diluted acids with evolution of highly flammable hydrogen gas. Reacts with halogens. Burns in air. Contact with alkali hydroxides or carbonates may cause detonation. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	**ROUTES OF EXPOSURE:** **INHALATION RISK:** **EFFECTS OF SHORT-TERM EXPOSURE:** The substance irritates the eyes. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 1440°C Melting point: 850°C	Relative density (water = 1): 1.54 Solubility in water: reaction
ENVIRONMENTAL DATA		

N O T E S

Reacts violently with fire extinguishing agents such as water, foam, halons and carbon dioxide. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-43G12; 42G13 (pyrophoric)

NFPA Code: H1; F1; R2; W

ADDITIONAL INFORMATION

ICSC: 1192 **CALCIUM**

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

CHROMIUM

ICSC: 0029

Chrome
Cr
Atomic mass: 52.0
(powder)

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000
October 27, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	No open flames if in powder form.	In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION		Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•**INHALATION**	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•**SKIN**		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•**EYES**	Redness.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•**INGESTION**		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I

M

P

PHYSICAL STATE; APPEARANCE:
GREY POWDER

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

ROUTES OF EXPOSURE:

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed.

O R T A N T D A T A	**CHEMICAL DANGERS:** Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances , causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004). MAK not established. OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts. NIOSH REL: TWA 0.5 mg/m^3 See Appendix C NIOSH IDLH: 250 mg/m^3 (as Cr) See: 7440473 **EFFECTS OF SHORT-TERM EXPOSURE:** May cause mechanical irritation tothe eyesandthe respiratory tract. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C Density: 7.15 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

N O T E S

The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.

ADDITIONAL INFORMATION

ICSC: 0029 **CHROMIUM**

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

COPPER

ICSC: 0240

Cu
(powder)

ICSC # 0240
CAS # 7440-50-8
RTECS # GL5325000
September 24, 1993 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from - See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0240

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

COPPER

ICSC: 0240

I

M

P

PHYSICAL STATE; APPEARANCE:
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

O **R** **T** **A** **N** **T** **D** **A** **T** **A**	Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.2 mg/m³ fume (ACGIH 1992-1993). TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993). Intended change 0.1 mg/m³ Inhal., A4 (not classifiable as a human carcinogen); MAK: 0.1 mg/m³ (Inhalable fraction) Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005). OSHA PEL*: TWA 1 mg/m^3 *Note: The PEL also applies to other copper compounds (as Cu) except copper fume. NIOSH REL*: TWA 1 mg/m^3 *Note: The REL also applies to other copper compounds (as Cu) except Copper fume. NIOSH IDLH: 100 mg/m^3 (as Cu) See: 7440508	**EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of fumes may cause metal fume fever. See Notes. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES	Boiling point: 2595°C Melting point: 1083°C Relative density (water = 1): 8.9	Solubility in water: none
ENVIRONMENTAL DATA		

N O T E S

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

ICSC: 0240 **COPPER**

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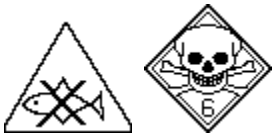
International Chemical Safety Cards

IRON (III)-o-ARSENITE, PENTAHYDRATE

ICSC: 1241

Ferric arsenite
$As_2Fe_2O_6 \cdot Fe_2O_3 \cdot 5H_2O$
Molecular mass: 607.3

ICSC # 1241
CAS # 63989-69-5
RTECS # NO4600000
UN # 1607
EC # 033-002-00-5
October 27, 1994 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Shortness of breath. Sore throat. Weakness. See Ingestion.	Avoid inhalation of fine dust and mist. Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Burning sensation. Diarrhoea. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	Separated from food and feedstuffs .	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Marine pollutant. Note: A, 1 T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1241

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

IRON (III)-o-ARSENITE, PENTAHYDRATE

ICSC: 1241

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** BROWN POWDER. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating or on burning producing toxic fumes of arsenic and iron. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as As) 0.01 mg/m³ as TWA; A1 (confirmed human carcinogen); BEI issued; (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed, especially if powdered. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes , the skin and the respiratory tract . The substance may cause effects on the nervous system, liver, skin, kidneys and gastrointestinal tract , resulting in kidney impairment, neuropathy, severe gastroenteritis, degenerative liver damage and dermatitis. Exposure may result in death. The effects may be delayed. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis, grey skin and hyperkeratosis. The substance may have effects on the nervous system,liver,cardiovascular system and respiratory tract , resulting in neuropathy, gangrene, degenerative liver damage and perforation of nasal septum. This substance is carcinogenic to humans.
PHYSICAL PROPERTIES	Solubility in water: none	
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to plants, air quality and water quality. It is strongly advised that this substance does not enter the environment. 	

N O T E S

Do NOT take working clothes home. See also ICSC0013 Arsenic. Card has been partly updated in April and October 2005. See sections Occupational Exposure Limits, EU classification, Emergency Response.

Transport Emergency Card: TEC (R)-61GT5-II

ADDITIONAL INFORMATION

ICSC: 1241 **IRON (III)-o-ARSENITE, PENTAHYDRATE**

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International Chemical Safety Cards

LEAD

ICSC: 0052

Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # OF7525000
October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

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International Chemical Safety Cards

LEAD

ICSC: 0052

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m³ (EU 2002).
OSHA PEL*: 1910.1025 TWA 0.050 mg/m^3 See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH REL*: TWA 0.050 mg/m^3 See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH IDLH: 100 mg/m^3 (as Pb) See: 7439921

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES		
	Boiling point: 1740°C	Density: 11.34 g/cm3
	Melting point: 327.5°C	Solubility in water: none

ENVIRONMENTAL DATA	
	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment. 

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

ICSC: 0052 **LEAD**

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International Chemical Safety Cards

MAGNESIUM (POWDER)

ICSC: 0289

Mg
Atomic mass: 24.30

ICSC # 0289
CAS # 7439-95-4
RTECS # OM2100000
UN # 1418
EC # 012-001-00-3 (pyrophoric)
April 12, 2000 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with moisture, acids, halogens and many other substances.	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Do NOT expose to friction or shock. Prevent build-up of electrostatic charges (e.g., by grounding).	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Laboured breathing. Headache. Dullness. Weakness. Fever or elevated body temperature.		
•SKIN			
•EYES	Redness. Pain.	Safety goggles.	
•INGESTION	Abdominal pain. Diarrhoea.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Fireproof. Separated from strong oxidants, acids. Dry.	Airtight. F symbol R: 15-17 S: 2-7/8-43 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2 UN Packing Group: ll

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0289

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MAGNESIUM (POWDER)

ICSC: 0289

I **M**	**PHYSICAL STATE; APPEARANCE:** GREY POWDER	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation.

P O R T A N T D A T A	**PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc. **CHEMICAL DANGERS:** The substance may spontaneously ignite on contact with air or moisture producing irritating or toxic fumes Reacts violently with strong oxidants. Reacts violently with many substances causing fire and explosion hazard. Reacts with acids and water forming flammable/explosive gas (hydrogen - see ICSC0001) causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK not established.	**INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of fumes may cause metal fume fever. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 1100°C Melting point: 651°C Density: 1.7 g/cm³	Solubility in water: none Auto-ignition temperature: 473°C Explosive limits, vol% in air: see Notes
ENVIRONMENTAL DATA		

N O T E S

Burns with an intense flame. In order to prevent eye injury do not look directly at magnesium fires. Reacts violently with fire extinguishing agents such as water, carbon dioxide and powder. Explosive limits, vol% in air: (LEL) 0.03 kg/m^3.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R2;

ADDITIONAL INFORMATION

ICSC: 0289 **MAGNESIUM (POWDER)**

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

MANGANESE

ICSC: 0174

Mn
Atomic mass: 54.9
(powder)

ICSC # 0174
CAS # 7439-96-5
RTECS # OO9275000
November 27, 2003 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Dry sand, special powder.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN		Protective gloves.	Rinse and then wash skin with water and soap.
•EYES		Safety goggles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from acids. Dry.	

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0174

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MANGANESE

ICSC: 0174

I	**PHYSICAL STATE; APPEARANCE:** GREY - WHITE POWDER **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

IMPORTANT DATA	Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts slowly with water more rapidly with steam and acids forming flammable/explosive gas (hydrogen - see ICSC0001) causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.2 mg/m³ (as TWA); (ACGIH 2003). MAK: (Inhalable fraction) 0.5 mg/m³; Pregnancy risk group: C; (DFG 2007). OSHA PEL*: C 5 mg/m^3 *Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl and Methyl cyclopentadienyl manganese tricarbonyl. NIOSH REL*: TWA 1 mg/m^3 ST 3 mg/m^3 *Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide. NIOSH IDLH: 500 mg/m^3 (as Mn) See: 7439965	**INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** The aerosol is irritating to the respiratory tract . **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the lungs and central nervous system , resulting in increased susceptibility to bronchitis, pneumonitis and neurologic, neuropsychiatric disorders (manganism). Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 1962°C Melting point: 1244°C Density: 7.47 g/cm³	Solubility in water: none
ENVIRONMENTAL DATA	This substance may be hazardous in the environment; special attention should be given to aquatic organisms. 	

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. The recommendations on this Card also apply to ferro manganese.

ADDITIONAL INFORMATION

ICSC: 0174 **MANGANESE**

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International Chemical Safety Cards

MERCURY

ICSC: 0056

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # OV4550000
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MERCURY

ICSC: 0056

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004).
MAK: 0.1 mg/m³ Sh
Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003).
OSHA PEL†: C 0.1 mg/m^3
NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 skin
Other: C 0.1 mg/m^3 skin
NIOSH IDLH: 10 mg/m^3 (as Hg) See: 7439976

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its vapour and through the skin , also as a vapour!

INHALATION RISK:
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous systemandkidneys. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the central nervous system kidneys , resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

PHYSICAL PROPERTIES

Boiling point: 357°C
Melting point: -39°C
Relative density (water = 1): 13.5
Solubility in water:
none

Vapour pressure, Pa at 20°C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

ICSC: 0056 **MERCURY**

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International Chemical Safety Cards

NICKEL

ICSC: 0062

Ni
Atomic mass: 58.7
(powder)

ICSC # 0062
CAS # 7440-02-0
RTECS # QR5950000
EC # 028-002-00-7
October 17, 2001 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	
•INHALATION	Cough. Shortness of breath.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Separated from strong acids.	Xn symbol R: 40-43 S: 2-22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NICKEL

ICSC: 0062

I

PHYSICAL STATE; APPEARANCE:
SILVERY METALLIC SOLID IN VARIOUS FORMS.

PHYSICAL DANGERS:

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of the dust.

IMPORTANT DATA	Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (Inhalable fraction) 1.5 mg/m³ as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004). MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004). OSHA PEL*†: TWA 1 mg/m^3 *Note: The PEL does not apply to Nickel carbonyl. NIOSH REL*: Ca TWA 0.015 mg/m^3 See Appendix A *Note: The REL does not apply to Nickel carbonyl. NIOSH IDLH: Ca 10 mg/m^3 (as Ni) See: 7440020	**INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** May cause mechanical irritation. Inhalation of fumes may cause pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 2730°C Melting point: 1455°C Density: 8.9 g/cm3	Solubility in water: none
ENVIRONMENTAL DATA		

N O T E S

At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062 **NICKEL**

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International Chemical Safety Cards

SILVER

ICSC: 0810

Argentium
C.I. 77820
Ag

ICSC # 0810
CAS # 7440-22-4
RTECS # VW3500000
September 10, 1997 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible, except as powder.		
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Rinse skin with plenty of water or shower.
•EYES		Safety spectacles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Separated from ammonia, strong hydrogen peroxide solutions, strong acids.	

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0810

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

SILVER

ICSC: 0810

I
M
P
O
R

PHYSICAL STATE; APPEARANCE:
WHITE METAL, TURNS DARK ON EXPOSURE TO OZONE, HYDROGEN SULFIDE OR SULFUR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Shock-sensitive compounds are formed with acetylene.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

T A N T D A T A	Reacts with acids causing fire hazard. Contact with strong hydrogen peroxide solution will cause violent decomposition to oxygen gas. Contact with ammonia may cause formation of compounds that are explosive when dry. **OCCUPATIONAL EXPOSURE LIMITS:** TLV (metal): 0.1 mg/m³ (ACGIH 1997). EU OEL: 0.1 mg/m³ as TWA (EU 2000). OSHA PEL: TWA 0.01 mg/m^3 NIOSH REL: TWA 0.01 mg/m^3 NIOSH IDLH: 10 mg/m^3 (as Ag) See: IDLH INDEX	**EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of high amounts of metallic silver vapours may cause lung damage with pulmonary oedema. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may cause a grey-blue discoloration of the eyes, nose, throat and skin (argyria/argyrosis).
PHYSICAL PROPERTIES	Boiling point: 2212°C Melting point: 962°C	Relative density (water = 1): 10.5 Solubility in water: none
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to aquatic organisms.	

N O T E S

Card has been partially updated in March 2008: see Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 0810 **SILVER**

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International Chemical Safety Cards

SODIUM

ICSC: 0717

Natrium
Na
Atomic mass: 23.0

ICSC # 0717
CAS # 7440-23-5
RTECS # VY0686000
UN # 1428
EC # 011-001-00-0
April 06, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO contact with water, acid(s) or halogens . NO open flames, NO sparks, and NO smoking.	Special powder, dry sand, NO other agents.
EXPLOSION	Risk of fire and explosion. on contact with acid(s) , halogens , water .		Combat fire from a sheltered position.
EXPOSURE			
•INHALATION	Cough. Sore throat. Burning sensation.	Closed system and ventilation.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Pain. Blisters. Serious skin burns.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•EYES	Severe deep burns. loss of vision.	Face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Shock or collapse.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Chemical protection suit including self-contained breathing apparatus. Cover the spilled material with dry powder.	Fireproof. Keep under mineral oil. Dry. Well closed.	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. F symbol C symbol R: 14/15-34 S: (1/2)-5 -8-43-45 UN Hazard Class: 4.3 UN Packing Group: I Signal: Danger Flame-Corr In contact with water releases flammable gases which may ignite spontaneously Causes severe skin burns and eye damage

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0717

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International Chemical Safety Cards

SODIUM

ICSC: 0717

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
SILVERY SOLID IN VARIOUS FORMS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts violently with water , causing fire and explosion hazard . The substance decomposes rapidly under the influence of air and moisture , forming flammable/explosive gas (Hydrogen - see ICSC0001) .

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK not established.

ROUTES OF EXPOSURE:
Serious local effects by all routes of exposure.

INHALATION RISK:

EFFECTS OF SHORT-TERM EXPOSURE:
See ICSC 0360 (Sodium hydroxide)

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

PHYSICAL PROPERTIES

Boiling point: 880°C
Melting point: 97.4°C
Density: 0.97 g/cm³
Solubility in water: reaction
Vapour pressure, Pa at 20°C: negligible
Auto-ignition temperature: 120-125°C

ENVIRONMENTAL DATA

NOTES

Sodium is always kept under mineral oil. Reacts violently with fire extinguishing agents such as water and carbon dioxide .

Transport Emergency Card: TEC (R)-43S1428a
NFPA Code: H3; F3; R2;

ADDITIONAL INFORMATION

ICSC: 0717 **SODIUM**

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International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

Blue powder
Merrillite
Zn
Atomic mass: 65.4
(powder)

ICSC # 1205
CAS # 7440-66-6
RTECS # ZG8600000
UN # 1436 (zinc powder or dust)
EC # 030-001-00-1
October 24, 1994 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust.	In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•**INHALATION**	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
•**SKIN**	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
•**EYES**		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•**INGESTION**	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus.	Fireproof. Separated from acids, bases oxidants Dry.	Airtight. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

SEE IMPORTANT INFORMATION ON BACK

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International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
ODOURLESS GREY TO BLUE POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. The effects may be delayed.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis.

PHYSICAL PROPERTIES

Boiling point: 907°C
Melting point: 419°C
Relative density (water = 1): 7.14
Solubility in water: reaction
Vapour pressure, kPa at 487°C: 0.1
Auto-ignition temperature: 460°C

ENVIRONMENTAL DATA

N O T E S

Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R1;

ADDITIONAL INFORMATION

ICSC: 1205 **ZINC POWDER**

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International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene
$C_{10}H_6Cl_8$
Molecular mass: 409.8

ICSC # 0740
CAS # 57-74-9
RTECS #
UN # 2996
EC # 602-047-00-8
March 26, 1998 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	(See Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Confusion. Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs bases and incompatible materials See Chemical Dangers. Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Severe marine pollutant. Xn symbol N symbol R: 21/22-40-50/53 S: 2-36/37-60-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
TECHNICAL: LIGHT YELLOW TO AMBER VISCOUS LIQUID

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on burning, on contact with bases producing toxic fumes including phosgene hydrogen chloride Attacks iron, zinc, plastic, rubber and coatings.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.5 mg/m³ as TWA (skin) A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004).
MAK: (Inhalable fraction) 0.5 mg/m³
Peak limitation category: II(8);
skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL: TWA 0.5 mg/m^3 skin
NIOSH REL: Ca TWA 0.5 mg/m^3 skin See Appendix A
NIOSH IDLH: Ca 100 mg/m^3 See: 57749

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.

EFFECTS OF SHORT-TERM EXPOSURE:
Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the liver immune system , resulting in tissue lesions and liver impairment. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point at 0.27kPa: 175°C
Relative density (water = 1): 1.59-1.63
Solubility in water:
none

Vapour pressure, Pa at 25°C: 0.0013
Octanol/water partition coefficient as log Pow: 2.78

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to soil organisms, honey bees. It is strongly advised that this substance does not enter the environment. The substance may cause long-term effects in the aquatic environment.

NOTES

If the substance is formulated with solvents also consult the ICSCs of these materials. Carrier solvents used in commercial formulations may change physical and toxicological properties. Belt, Chlor Kil, Chlortox, Corodan, Gold Crest, Intox, Kypchlor, Niran, Octachlor, Sydane, Synklor, Termi-Ded, Topiclor, and Toxichlor are trade names. Also consult ICSC 0743 Heptachlor.

Transport Emergency Card: TEC (R)-61GT6-III

ADDITIONAL INFORMATION

ICSC: 0740 **CHLORDANE (TECHNICAL PRODUCT)**

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

APPENDIX D

HOSPITAL INFORMATION AND MAP

FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

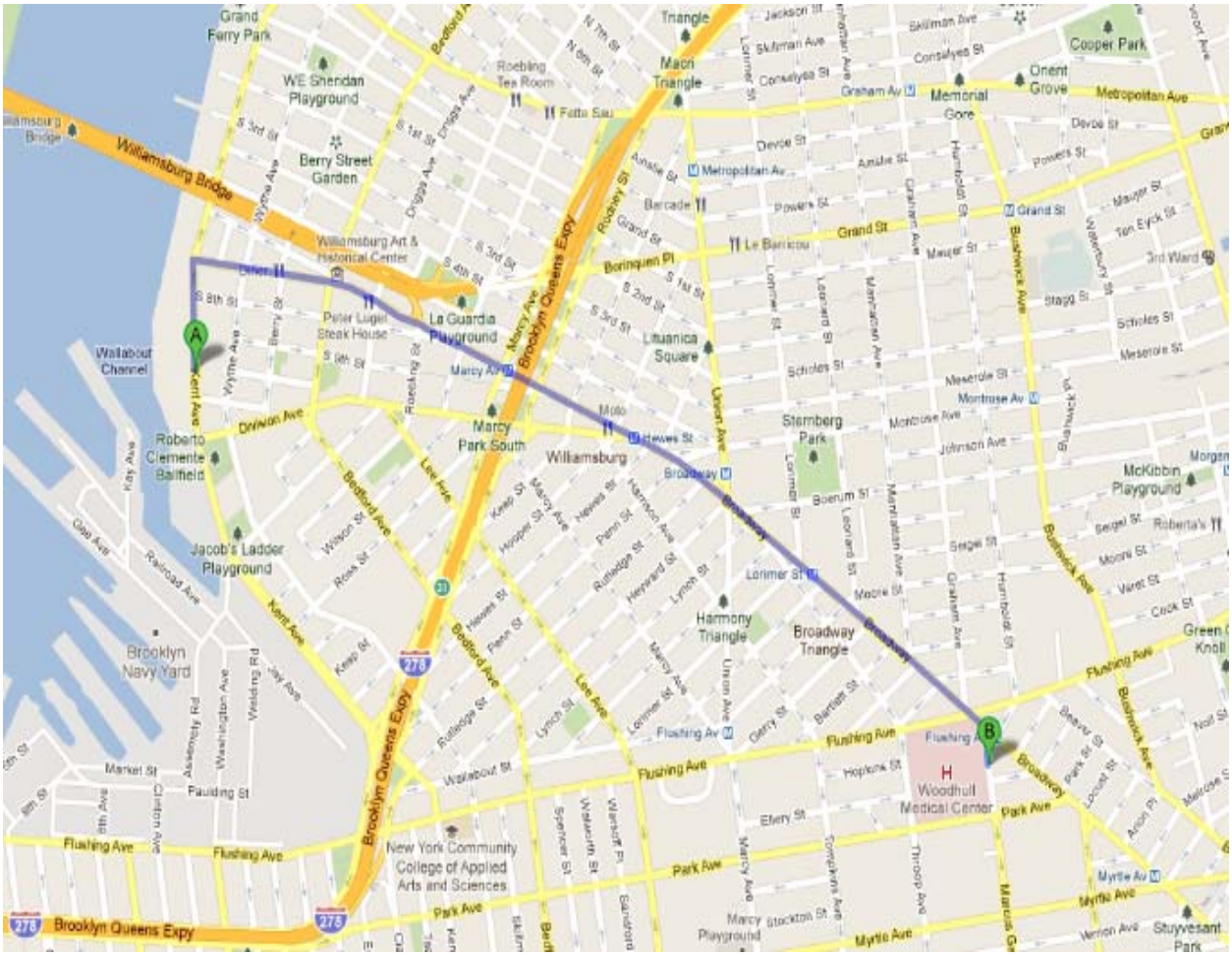
INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

Woodhull Medical Center
760 Broadway
Brooklyn, NY 11206
(718) 963-8000

Distance: 1.8 miles Time: 8 minutes (approximate)



Directions

Distance: **1.8 miles** Time: **8 mins**

1. Head North on **KENT AVE, BROOKLYN** going toward **S 8th STR** - go **0.2** mi
2. Turn Right on **BROADWAY** - go **1.6** mi
3. Turn right onto **MARCUS GARVEY BLVD/SUMNER AVE** - go **253** ft
4. Arrive at **WOODHULL MEDICAL CENTER 760 BROADWAY, BROOKLYN**

ATTACHMENT D
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
Former Domsey Fiber Corp Site
431 Kent Avenue, Brooklyn, NY
BCP No. 224158

Prepared on behalf of:

Wythe and Kent Realty LLC
144 Spencer Avenue
Brooklyn, NY 11205

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961

TABLE OF CONTENTS

QUALITY ASSURANCE PROJECT PLAN

Former Domsey Fiber Corp Site
431 Kent Avenue, Brooklyn, NY

TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the project, as required by the approved Remedial Action Work Plan.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The EBC Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. As Project Director, Mr. Sosik will also serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Kevin Brussee will serve as the Project Manager and will be responsible for implementation of the Remedial Action and coordination with excavation crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, direct the excavation crew and be responsible for the collection and handling of all samples.

1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager.

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Supervision of Field Crew, sample collection and handling	K. Waters, EBC
Project Manager	Implementation of the RI according to the RIWP.	Kevin Brussee, EBC
Laboratory Analysis	Analysis of soil samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory
Data review	Review for completeness and compliance	3rd party validation

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2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES

2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.

- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

2.2 QA / QC Requirements for Analytical Laboratory

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate contaminants such as metals and semi-volatile organic compounds (SVOCs) in both historic fills and hot-spot areas, chlorinated volatile organic compounds (VOCs) in soil, soil gas and groundwater and SVOCs in groundwater. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005. The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

2.2.1 Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005.

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

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2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyte-free matrix which includes the same reagents, internal standards and surrogate standards as me related samples. II is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Trip Blanks.

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.5 Surrogate Spike Analysis

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of one for every 20 field samples. The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:
SSR = spike sample results

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SR = sample results
SA = spike added from spiking mix

2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without a Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 - D^2)/2} \times 100$$

Where:
RPD = relative percent difference
D^1 = first sample value
D^2 = second sample value (duplicate)

2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Remedial Action Work Plan.

2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.

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7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

2.8 Laboratory Custody Procedures

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

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3.0 ANALYTICAL PROCEDURES

3.1 Laboratory Analysis

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs in soil / groundwater by USEPA Method 8260, SVOCs in soil / groundwater by USEPA Method 8270BN, Metals including chromium, hexavalent chromium, manganese, nickel and silver in soil. If any modifications or additions to the standard procedures are anticipated and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).

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4.0 DATA REDUCTION, REVIEW, AND REPORTING

4.1 Overview

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

4.2 Data Reduction

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Note that waste characterization samples will be in results only format and will not be evaluated in the DUSR.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

4.3 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Note that waste characterization samples will be in results only format and will not be evaluated in the DUSR.

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5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

Any changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.

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TABLE 1
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Subsurface soil (0 to 25 feet bgs)	4 to 10 borings in the northwest corner of the building and northwest exterior of the building near the Zone A-B3 boring	8 to 30	To supplement previous sampling and delineate CVOC and petroleum affected soil in the northeast interior of the building.	VOCs EPA Method 8260B and SVOCs EPA Method 8270 CP51
Subsurface soil (13 to 19 feet bgs)	1 boring at the Zone A B1 location with samples retained at 13-15 ft, 15-17 ft and 17-19 ft intervals.	3	To confirm and vertically delineate elevated chromium reported at this location.	Chromium and hexavalent chromium
Subsurface soil (13 to 19 feet bgs)	1 boring at the Zone A B4 location with samples retained at 13-15 ft, 15-17 ft and 17-19 ft intervals.	3	To confirm and vertically delineate elevated manganese reported at this location.	Manganese
Subsurface soil (13 to 19 feet bgs)	1 boring at the Zone A B7 location with samples retained at 13-15 ft, 15-17 ft and 17-19 ft intervals.	3	To confirm and vertically delineate elevated chromium and silver reported at this location.	Chromium, hexavalent chromium and silver
Subsurface soil (13 to 15 feet bgs)	5 to 9 borings in the south central area of the building near the Zone C-B1 boring	15 to 27	To confirm and delineate elevated chromium and nickel reported at this location.	Chromium, hexavalent chromium and nickel
Total (Soils)		32 to 66		
Shallow Groundwater (water table)	From 4 monitoring wells in the vicinity of the Zone A B3 location and 7monitoring wells installed across the Site.	11	To supplement previous sampling and delineate VOC and petroleum affected groundwater.	VOCs EPA Method 8260B and SVOCs EPA Method 8270 CP51
Deep Groundwater (13-18 ft below water table)	From 4 monitoring wells installed at shallow well locations MW3, MW4, MW6 and MW7.	4	To supplement previous sampling and delineate VOC and petroleum affected groundwater.	VOCs EPA Method 8260B
Total (Groundwater)		15		
Soil Gas (12 ft below existing slab	13 soil gas implants to be installed around perimeter of Site.	13	Evaluate soil gas at perimeter of Site.	VOCs EPA Method TO15
Total (Soil Gas)		13		
MS/MSD	Matrix spike and Matrix spike duplicates at the rate 5%	3 to 5	To meet requirements of QA / QC program	VOCs EPA Method 8260B, SVOCs EPA Method 8270 BN and / or chromium, hexavalent chromium, manganese, silver and nickel
Trip Blanks	One laboratory prepared trip blank to accompany samples each time they are delivered to the laboratory.	2 to 4	To meet requirements of QA / QC program	VOCs EPA Method 8260B
Total (QA / QC Samples)		5 to 9		

TABLE 2
SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

Sample Type	Matrix	Sampling Device	Parameter	Sample Container	Sample Preservation	Analytical Method#	CRQL / MDLH	Holding Time
Soil	Soil	Scoop Direct into Jar	VOCs	(1) 2 oz Jar	Cool to 4° C HCL	EPA Method 8260	Compound specific (1-5 ug/kg)	14 days
Soil	Soil	Scoop Direct into Jar	SVOCs	(1) 8 oz jar	Cool to 4° C	EPA Method 8270 BN	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Pest/PCBs	from 8oz jar above	Cool to 4° C	EPA Method 8081/8082	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Metals	from 8oz jar above	Cool to 4° C	TAL Metals	Compound specific (01-1 mg/kg)	6 months
Groundwater	Water	Pump tubing	VOCs	(3) 40 ml vials	Cool to 4° C	EPA Method 8260	Compound specific (1-5 ug/L)	14 days
Groundwater	Water	Pump tubing	SVOCs	(1) 1 Liter Amber Bottle	Cool to 4° C	EPA Method 8270 BN	Compound specific (1-5 ug/L)	14 days
Groundwater	Water	Pump tubing	Pesticides and PCBs	(2) 1 Liter Amber Bottle	Cool to 4° C	EPA Method 8081 / 8082	Compound specific (1-5 ug/L)	14 days
Groundwater	water	Pump tubing	Total Metals	(1) 100 ml	HNO3	TAL Metals	Compound specific (1-5 mg/L)	6 months
Groundwater	water	Pump tubing	Dissolved Metals	(1) 100 ml	None	TAL Metals	Compound specific (1-5 mg/L)	6 months

Notes:
All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. * Holding time listed is from time of sample collection.
The number in parentheses in the "Sample Container" column denotes the number of containers needed.
Triple volume required when collected MS/MSD samples
The number of trip blanks are estimated.
CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit.
MCAWW = Methods for Chemical Analysis of Water and Wastes.
NA = Not available or not applicable.

ATTACHMENT E
Storm Water Pollution Prevention Plan

1358331598

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR _____
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-10-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Wythe and Kent Realty LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Braver

Owner/Operator Contact Person First Name
Joel

Owner/Operator Mailing Address
144 Spencer Street

City
Brooklyn

State
NY

Zip
11205 -

Phone (Owner/Operator)
7186252000

Fax (Owner/Operator)
- -

Email (Owner/Operator)
expresbuilders@gmail.com

FED TAX ID
452525590 (not required for individuals)

Project Site Information

Project/Site Name
FORMER DOMSEY FIBER CORP SITE

Street Address (NOT P.O. BOX)
431 Kent Avenue

Side of Street
○ **North** ○ **South** ● **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
New York City

State: NY
Zip: **11211**-
County: Kings
DEC Region: 2

Name of Nearest Cross Street
N. 11th Street

Distance to Nearest Cross Street (Feet)
0

Project In Relation to Cross Street
● **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
2135 - 1

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 587191

Y Coordinates (Northing): 4500668888

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in imperviousness**

● **Redevelopment with no increase in imperviousness**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ● COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ● MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***note: for gas well drilling, non-high volume hydraulic fractured wells only**

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ? ○ **Yes** ● **No**

5. Is this a project which does not require coverage under the General Permit (e.g. Project done under an Individual SPDES Permit, or department approved remediation)? ○ **Yes** ● **No**

6. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ● **No**

7. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. Round to the nearest tenth of an acre.

Total Site Acreage	**Acreage To Be Disturbed**	**Existing Impervious Area Within Disturbed**	**Future Impervious Area Within Disturbed**
2.52.5	2.52.5	2.52.5	2.52.5

8. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ● **No**

9. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	**B**	**C**	**D**
75%	25%	%	%

10. Is this a phased project? ○ Yes ● No

11. Enter the planned start and end dates of the disturbance activities

Start Date 09/01/12 - End Date 11/01/12

12. Identify the nearest, natural, surface waterbody(ies) to which construction site runoff will discharge.

Name: East River

12a. Type of waterbody identified in Question 12?

- ○ Wetland / State Jurisdiction On Site (Answer 12b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 12b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ● River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

12b. How was the wetland identified?

- ● Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment in Appendix E of GP-0-10-001? ○ Yes ● No

14. Is this project located in one of the Watersheds identified in Appendix C of GP-0-10-001? ○ Yes ● No

15. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? **If no, skip question 16.** ○ Yes ● No

16. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? **If Yes, what is the acreage to be disturbed?** ○ **Yes** ● **No**

.

17. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

18. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ **Yes** ○ **No** ● **Unknown**

19. What is the name of the municipality/entity that owns the separate storm sewer system?

New York City DEP

20. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ○ **No** ● **Unknown**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book) ? ● **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) **(If No, skip questions 23 and 27-35)** ○ **Yes** ● **No**

23. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ? ○ **Yes** ● **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer
AMC Engineering PLLC

Contact Name (Last, Space, First)
Czemerinski, Ariel

Mailing Address
99 Jericho Turnpike, Suite 300J

City
Jericho

State
NY

Zip
11753-

Phone
5164178588

Fax
5167063214

Email
ariel@amc-engineering.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-10-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name
Ariel

MI
M

Last Name
Czemerinski

Signature

Date
10/22/2012

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ● Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ○ Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Water Quality and Quantity Control

Important: Completion of Questions 27-35 is not required if response to Question 22 is No.

Post-Construction Stormwater Management Practices

27. Indicate **all** Stormwater Management Practice(s) that will be installed/constructed on this site:

Ponds
- ○ **Micropool Extended Detention (P-1)**
- ○ **Wet Pond (P-2)**
- ○ **Wet Extended Detention (P-3)**
- ○ **Multiple Pond System (P-4)**
- ○ **Pocket Pond (P-5)**

Filtering
- ○ **Surface Sand Filter (F-1)**
- ○ **Underground Sand Filter (F-2)**
- ○ **Perimeter Sand Filter (F-3)**
- ○ **Organic Filter (F-4)**
- ○ **Bioretention (F-5)**
- ○ **Other**

Alternative Practice
- ○ **Rain Garden**
- ○ **Cistern**
- ○ **Green Roof**
- ○ **Stormwater Planters**
- ○ **Permeable Paving (Modular Block)**

Wetlands
- ○ **Shallow Wetland (W-1)**
- ○ **Extended Detention Wetland (W-2)**
- ○ **Pond/Wetland System (W-3)**
- ○ **Pocket Wetland (W-4)**

Infiltration
- ○ **Infiltration Trench (I-1)**
- ○ **Infiltration Basin (I-2)**
- ○ **Dry Well (I-3)**
- ○ **Underground Infiltration System**

Open Channels
- ○ **Dry Swale (O-1)**
- ○ **Wet Swale (O-2)**

Verified Proprietary Practice
- ○ **Hydrodynamic**
- ○ **Wet Vault**
- ○ **Media Filter**

28. Describe other stormwater management practices not listed above or explain any deviations from the technical standards.

29. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ● **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

30. Provide the total water quality volume required and the total provided for the site.

WQv Required ☐☐☐.☐☐☐ **acre-feet**

WQv Provided ☐☐☐.☐☐☐ **acre-feet**

31. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required ☐☐☐.☐☐☐ **acre-feet**

CPv Provided ☐☐☐.☐☐☐ **acre-feet**

31a. The need to provide for channel protection has been waived because:

○ **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

31b. The need to provide for flood control has been waived because:

○ **Site discharges directly to fourth order stream or larger**

● **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 31 and 32, impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s). (Total Drainage Area = Project Site + Offsite areas)

32. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins. ☐☐☐%

33. Post-Construction Impervious Area - As a percent of the Total Drainage Area, enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction. ☐☐☐%

34. Indicate the total number of post-construction stormwater management practices to be installed/constructed. ☐☐

35. Provide the total number of stormwater discharge points from the site. (include discharges to either surface waters or to separate storm sewer systems) ☐☐

36. Identify other DEC permits that are required for this project.

DEC Permits

○ Air Pollution Control	○ Navigable Waters Protection / Article 15
○ Coastal Erosion	○ Water Quality Certificate
○ Hazardous Waste	○ Dam Safety
○ Long Island Wells	○ Water Supply
○ Mined Land Reclamation	○ Freshwater Wetlands/Article 24
○ Other SPDES	○ Tidal Wetlands
○ Solid Waste	○ Wild, Scenic and Recreational Rivers
● None	○ Stream Bed or Bank Protection / Article 15

○ Other

37. Does this project require a US Army Corps of Engineers Wetland Permit? ○ Yes ● No
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ].[ ]

38. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ Yes ● No
(If No, skip question 39)

39. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ Yes ○ No

40. If this NOI is being submitted for the purpose of continuing coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name [b][e][r][l] **MI** [ ]

Print Last Name [j][a][c][o][b][o][w][i][t][z]

Owner/Operator Signature [signature]

Date [1][0] / [2][3] / [2][0][1][2]

ATTACHMENT F
Community Air Monitoring Plan

NEW YORK STATE BROWNFIELDS CLEANUP PROGRAM
Site No. C224158

COMMUNITY AIR MONITORING PLAN

FORMER DOMSEY FIBER CORP SITE
431 KENT AVENUE
BROOKLYN, NY

JULY - 2012

FORMER DOMSEY FIBER CORP SITE

COMMUNITY AIR MONITORING PLAN
TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for the remedial and construction/foundation activities to be performed under the Remedial Action Work Plan at the Former Domsey Fiber Corp Site. The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers, not directly involved in the remedial work, from potential airborne contaminant releases resulting from excavation and soil loading activities at the site.

Compliance with this CAMP is required during all activities associated with soil excavation that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include excavation of soils, stockpiling, loading, and backfilling. This CAMP has been prepared to ensure that remediation activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of construction-related contaminants to offsite areas.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;

- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

Chlorinated volatile organic compounds (VOCs), petroleum VOCs and SVOCs, and metals are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time VOC and air particulate (dust) monitoring.

2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before activities begin. These points will be monitored periodically in series during the site work. When the excavation area is within 20 feet of potentially exposed populations or occupied structures, the perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remedial activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 6-mil plastic sheeting;
- hauling waste materials in properly tarped containers; and/or
- applying vapor suppressant foam.

4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during excavation and loading activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM_{10}) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ($\mu g/m_3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu g/m^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100 $\mu g/m^3$ greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must 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 must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) 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 will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 $\mu g/m^3$ at any time during remediation activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 8-mil plastic sheeting;
- hauling waste materials in properly tarped containers; and/or
- limiting vehicle speeds onsite.

Work may continue with dust suppression techniques provided that downwind PM_{10} levels are not more than 150 $\mu g/m^3$ greater than the upwind levels.

There may also be situations where the dust is generated by remediation activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 $\mu g/m^3$, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.

1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961
PHONE 631.504.6000
FAX 631.924.2870

APPENDIX A
ACTION LIMIT REPORT

CAMP
ACTION LIMIT REPORT

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

UPWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

BACKGROUND CORRECTED LEVELS

Monitor ID #: Location: _____ Level Reported: Level Reported: _____

ACTIONS TAKEN

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ATTACHMENT G
Citizen Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

FORMER DOMSEY FIBER CORP SITE

431 Kent Avenue
Brooklyn, New York 11249

June 2012

Contents

* * * * *

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: **Wythe and Kent Realty LLC**
Site Name: **Former Domsey Fiber Corp ("Site")**
Site Address: **431 Manhattan Avenue, Brooklyn**
Site County: **Kings**
Site Number: **C224158**

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 that 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 interest 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; and

- 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 website. 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; and
- 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.

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.

- **Document repositories** allow the public to access and review project documents including investigation and cleanup work plans and final reports.

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.

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 Requirements (Activities)	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repositories	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:	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation
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 proposed 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 summarizes the Final Engineering Report • Distribute fact sheet to site contact list announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets are combined if 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.

The major issues of concern to the public will be potential impacts of nuisance odors and dust during the removal of affected soil at the Site. Another example of a major issue of public concern would be the impact of increased truck traffic on the surrounding neighborhood. Construction safety issues will also be addressed. In addition, this Site may be located in a potential environmental justice area. Furthermore, it may be determined that translation services may be necessary for fact sheets and public meetings. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP) are required components of the remedial program. Implementation of these plans will be under the direct oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

These plans will specify the following worker and community health and safety activities during remedial activity at the Site:

- On-site air monitoring for worker protection;
- Perimeter air monitoring for community protection;
- The use of odor, vapor, and dust controls, such as water or foam sprays, as needed;
- Monitoring and control of soil, sediments, and water generated during remediation; and
- Truck routes which avoid residential streets.

The HASP and the CAMP will be prepared as part of the Remedial Action Work Plan (RAWP) and will be available for public review at the document repository as identified in Appendix A (page 11).

The demographic analysis for this Site indicates that approximately 43% of the population surrounding this site is not proficient in English, and that Spanish is spoken in approximately 50% of the homes. **Therefore, all fact sheets will be distributed in both English and Spanish.**

Furthermore, the Applicant has prepared a Scoping Sheet for Major Issues of Public Concern which will assist them in identifying any concerns. Experience from similar projects, 311 complaints and other construction projects in the area will help in identifying such issues.

4. Site Information

Appendix C contains a map identifying the location of the Site.

Site Description

The Site to be remediated and redeveloped is located in the Williamsburg section of Brooklyn and is comprised of single tax parcels (Lot 1) totaling 3.09 acres. The lot has frontage along S. 11th Street, S. 9th Street, Wythe Avenue and Kent Avenue. With the exception of a commercial business in a small portion of the southwest corner of the property, the buildings are currently vacant.

The subject site is developed with three buildings as follows:

Two-story brick building - (44 South 9th Street) - The two-story brick building is located on the southwest corner of the intersection of Wythe Avenue and South 9th Street. The building was constructed prior to 1935. The building has no basement. The building was vacant, but was finished. Ceiling tiles, walls and flooring were in extremely poor condition and heavily water damaged.

Four-story brick building - (36 to 38 South 9th Street) - The three-story brick building is adjacent to the two-story brick building, and fronts the northern portion of the lot that was formerly South 9th Street. The building has a full basement, which is currently empty. The building was constructed prior to 1918. A small open air alleyway is located between the two-story brick building and the four-story brick building. An old transformer shed is located at the rear of the alley.

Warehouse building - The majority of the lot is developed with a one-story concrete block warehouse building that was constructed in 1959. The southern half of the building is currently utilized by Lucky Supplies, which is a warehouse facility that sells plastic food containers. They operate from loading docks that enter/exit from South 11th Street. The other half of the warehouse building is currently vacant. The northwestern portion of the warehouse building has a second floor which is set up as office space (also vacant).

The elevation of the property ranges from approximately 16 to 25 feet above the National Geodetic Vertical Datum (NGVD) feet. The depth to groundwater beneath the Site, as determined from field measurements, is approximately 20 feet below grade. Based on regional groundwater contour maps, groundwater flow is expected to be toward the East River approximately 358 feet west of the Site.

The area surrounding the Site consists of a mix of new multi-family residential buildings and underutilized commercial / industrial buildings. Most properties to the north along S. 8th Street as well as the properties located to the east along Wythe Avenue are developed with established and new multi-family residential properties. Most of the properties to the south and west along the waterfront are old industrial buildings and or vacant lots.

History of Site Use, Investigation, and Cleanup

The Site was developed prior to 1884 and occupied by a variety of industrial and commercial

operations through 1945 including a steam pump manufacturer, machine shop, leather belting manufacturer, pen manufacturer, tin shop, silver polish manufacturer, a blacksmith, coffin manufacturer, paint manufacturer, wagon maker, parking garage, auto repair, rag sorting, iron & steel storage yard, fur dressing and dyeing, plating, cut sole manufacturing, appliance manufacturing and an analytical laboratory.

By the 1947, nearly all of the site occupants had been replaced by the F&M Schaeffer Brewing Company, which utilized the older buildings as warehouse storage. The F&M Schaeffer Brewing Company closed it's Brooklyn facility in 1976. Several businesses conducted operations at the Site following Schaeffer, most notably the Domsey Fiber Corp (a used clothing factory with on-site dry cleaning and an outlet store that operated in the mid 1980's to early 2000's) and Brooklyn Sleep Products (reconditioning of used mattresses and new mattress manufacturing). The majority of the property is vacant and underutilized. One business remains on the property, and is identified as Lucky Supply, Inc. (an aluminum and plastic food storage container distributor and warehouse that still operates the southern half of the warehouse building).

Several environmental issues associated with the past use of the property were identified during an extensive subsurface investigation performed at the Site in January 2012.

The investigation noted that soil and groundwater at the Site have been affected by a release(s) of petroleum and chlorinated solvents and that the sources of these releases have not been identified. Chlorinated solvents may also be off-gassing from affected soil and / or groundwater. In addition, soil in the central area of the property may be affected with chromium and nickel as a result of past operations.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program (BCP) 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 on-site, 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 proposes that the Site will be used for unrestricted purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement (BCA) executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant has completed a detailed site investigation before it entered into the BCP. For the

investigation, NYSDEC will determine if the data are useable. 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.

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 Asignificant 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.

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 (COC) (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 proposed Remedial Work Plan for approval, NYSDEC would announce the availability of the proposed 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 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 (FER) 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 FER. NYSDEC then will issue a 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

Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination will remain in place. 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 (SMP).

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 is pumping and treating 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):

Shaun Bollers
Project Manager
NYSDEC Region 2
Division of Environmental Remediation
One Hunters Point Plaza 47-40 21st Street
Long Island City, NY 11101
Tel: (718) 482-4096
Email: snboller@gw.dec.state.ny.us

Thomas Panzone
Regional Citizen Participation Specialist
NYSDEC Region 2
Division of Environmental Remediation
One Hunters Point Plaza 47-40 21st Street
Long Island City, NY 11101
Tel: (718) 482-4953

New York State Department of Health (NYSDOH):
Bridget Callaghan
New York State Department of Health
Bureau of Environmental Exposure Investigation
Flanigan Square -547 River Street
Troy, New York 12180-2216
Tel: (518) 402-7860
Email: beei@health.state.ny.us

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Brooklyn Public Library – Leonard Street Branch
81 Devoe Street, Brooklyn, NY 11215
(718) 486-3365

Hours:
Mon 10:00 AM - 6:00 PM
Tue 1:00 PM - 8:00 PM
Wed 10:00 AM - 6:00 PM
Thu 10:00 AM - 6:00 PM
Fri 10:00 AM - 6:00 PM
Sat 10:00 AM - 5:00 PM
Sun closed

Appendix B - Site Contact List

Local Government Contacts:

City of New York
Michael Bloomberg
Mayor of New York City
City Hall
New York, NY 10007

Marty Markowitz
Brooklyn Borough President
209 Joralemon Street
Brooklyn, NY 11201

Christopher Olechowski
Chair, Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY, 11211

Gerald Esposito
District Manager, Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY, 11211

Stephen Levin
NYC Council Member
33rd District
410 Atlantic Avenue
Brooklyn, NY 11217

Amanda M. Burden, Commissioner
NYC Dept. of City Planning
22 Reade St.
Third Floor
New York, NY 10007

Dr. Robert Kulikowski, Director
NYC Office of Environmental Coordination
253 Broadway – 14th Floor
New York, NY 10007

New York City Department of Transportation
Brooklyn Borough Commissioner
Attn: Joseph Palmieri
16 Court Street
Brooklyn, NY 11241

Nancy T. Sunshine, County Clerk
Kings County Clerk's Office
360 Adams Street, Room 189
Brooklyn, NY 11201

Hon. Bill de Blasio
Public Advocate
1 Centre Street, 15th Floor
New York, NY 10007

Hon. John Liu
NYC Office of the Comptroller
1 Centre Street
New York, NY 10007

Hon. Daniel Squadron
NYS Senator
250 Broadway Suite 2011
New York, NY 10007

Hon. Joseph R. Lentol
NYS Assembly Member
619 Lorimer Street
Brooklyn, NY 11211

Hon. Charles Schumer
U.S. Senator
757 Third Avenue, Suite 17-02
New York, NY 10017

Hon. Kirsten Gillibrand
U.S. Senator
780 Third Avenue, Suite 2601
New York, NY 10017

Hon. Nydia M. Velazquez
U.S. House of Representatives
266 Broadway, Suite 201
Brooklyn, NY 11211

John Wuthenow

Office of Environmental Planning & Assessment
NYC Dept. of Environmental Protection
96-05 Horace Harding Expressway
Flushing, NY 11373

Daniel Walsh
Director
NYC Office of Environmental Remediation
253 Broadway – 14th Floor
New York, NY 10007

Local News Media:

The Brooklyn Paper
One Metrotech Center, Suite 1001
Brooklyn, NY 11201
(718) 260-4504

Courier-Life Publications
1 Metro-Tech Center North - 10th Floor
Brooklyn, NY 11201

Brooklyn Daily Eagle
30 Henry Street
Brooklyn, NY 11201

New York 1 News
75 Ninth Avenue
New York, NY 10011

News 12 Brooklyn
164 20th Street, 4th Floor
Brooklyn, NY 11232

New York Daily News
450 W. 33rd Street
New York, NY 10001

New York Post
1211 Avenue of the Americas
New York, NY 10036-8790

Nowy Dziennik (Polish Daily News)
70 Outwater Lane
Garfield, NY 07026

El Diario La Prensa

1 MetroTech Center, 18th Floor
Brooklyn, NY 11201

Public Water Supplier:
New York City Department of Environmental Protection
Attn: Hon. Carter Strickland, Commissioner
59-17 Junction Boulevard
Flushing, NY 11373

Schools and Daycare Facilities:

1 Jewish Center for Special Education and Machon Bais Pessel Rivkah-Girls
430 Kent Avenue, Suite 2
Brooklyn, NY 11211
(718) 782-0064

2 Be'lkvei Hatzoin
Ohel Sura School
31 Division Avenue
Brooklyn, NY 11249-6615
(718) 486-6363

3 Kolel Yetev Lev
84 Broadway # 2
Brooklyn, NY 11249-6049
(718) 625-7335

4 E. Nopi Williamsburg
FasTracKids
60 Broadway
Brooklyn, NY 11249
(347) 987-4450

5 Yeshiva Beth Josef Zvi
135 Ross St # A
Brooklyn, NY 11211-7728
(718) 599-6938

6 Williamsburg Collegiate Charter School
157 Wilson Street
Brooklyn, NY 11211
(718) 302-4018

7 Public School 16 Leonard Dunkly

157 Wilson Street
Brooklyn, NY 11211-7797
(718) 782-5352

8 Yeshiva Yesoda Hatora of K'Hal Adas Yereim
505 Bedford Avenue
New York, NY 11211
(718) 302-7500

9 Jewish Center For Special Education
500 Bedford Avenue
Brooklyn, NY 11211-6705
(718) 486-6286

10 Yetev Lev
165 Clymer Street
Brooklyn, NY 11211-7103
(718) 387-8313

11 Yeshiva Bnai Yesucher
467 Bedford Avenue
Brooklyn, NY 11211
(718) 387-0141

12 Yeshivas Ahavas Israel
6 Lee Avenue
Brooklyn, NY 11211-7107
(718) 388-0848

13 Mesivta Nachlas Yacov-A Yerim Cong Adas Yerein Inc
185 Wilson Street
Brooklyn, NY 11211-7206
(718) 388-1751

14 Bnos Yakov School For Girls and Yeshiva Kehilath Yakov
206 Wilson Street
Brooklyn, NY 11211-7207
(718) 963-3940, (718) 963-1212

15 Yeshiva Yesode Hatorah
195 Wilson Street
Brooklyn, NY 11211-7206
(718) 305-6031

16 Yeshiva of Nitra Rabbinical College
194 Division Avenue

Brooklyn, NY 11211-7108
(718) 384-5460

17 Kollel Sharei Limud
171 South 9th Street
Brooklyn, NY 11211-8713
(718) 302-9823

18 Williamsburg "Y" Head Start
64 Division Avenue
Brooklyn, NY 11211

Community, Civic, Religious and other Educational Institutions

Open Space Alliance of North Brooklyn
79 North 11th Street
Brooklyn, NY 11211

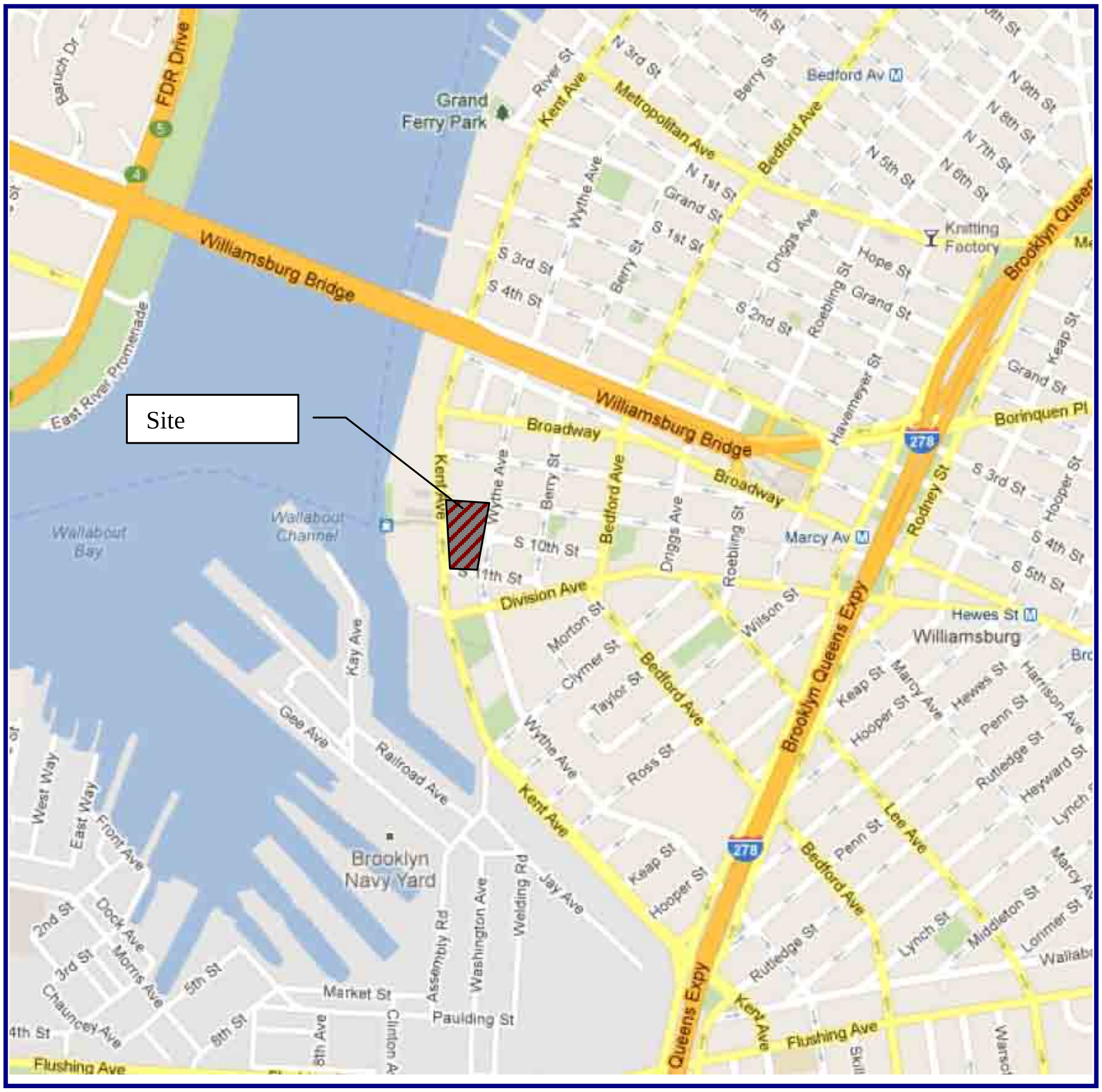
Brooklyn Chamber of Commerce
25 Elm Place, Suite 200 2nd Floor
Brooklyn, NY 11201

Taylor-Wythe Houses
632 Wythe Place
Brooklyn, NY 11211
Attn: Management Office

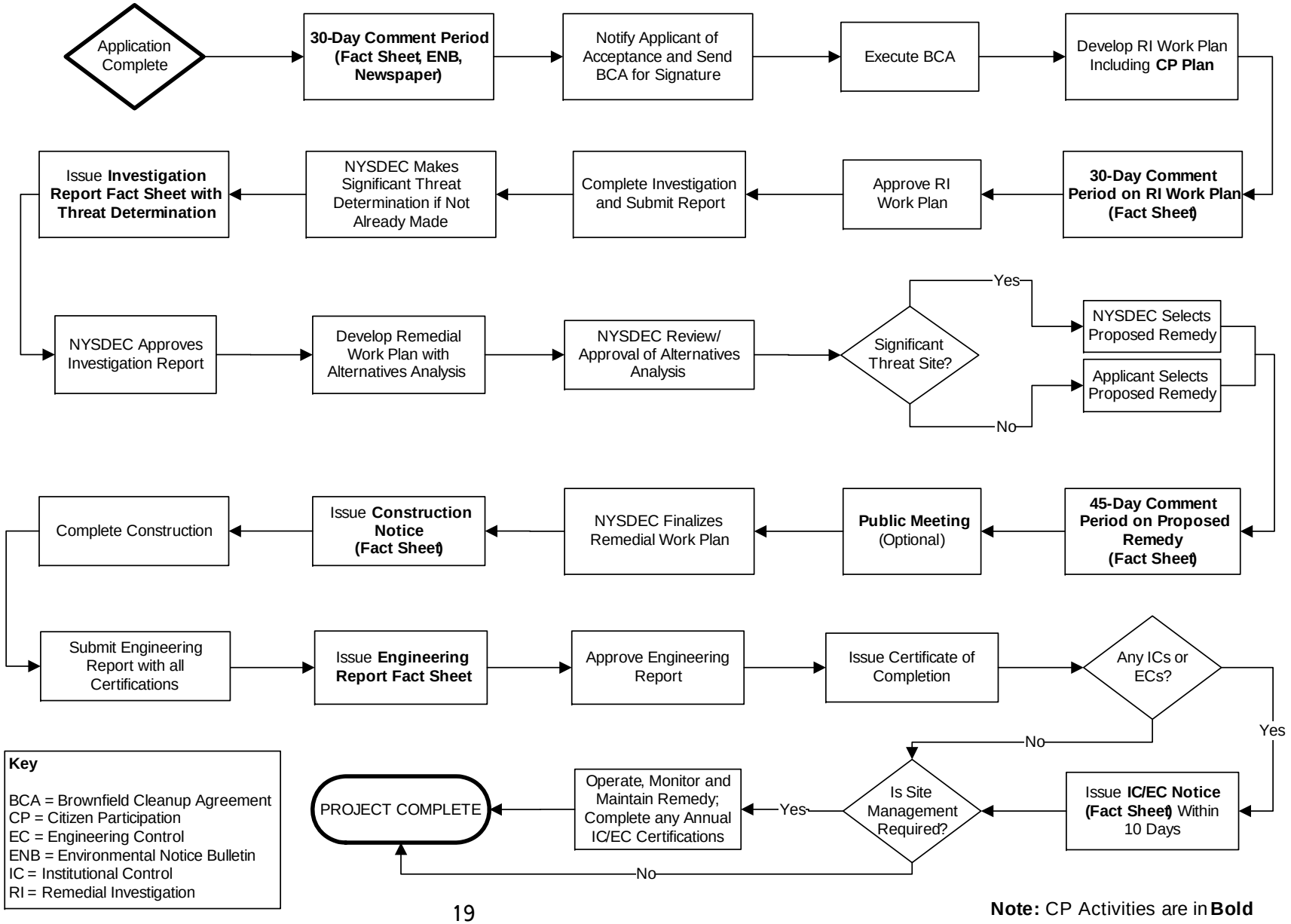
Taylor-Wythe Houses
632 Wythe Place
Brooklyn, NY 11211
Attn: President, Resident Association

Taylor Wythe Community Center
115 Clymer Street
Brooklyn, NY 11211
Attn: Director

Appendix C - Site Location Map


Site
Williamsburg Bridge
Williamsburg Bridge
FDR Drive
East River Promenade
Baruch Dr
Grand Ferry Park
Wallabout Bay
Wallabout Channel
Brooklyn Navy Yard
Williamsburg
Knitting Factory
Kent Ave
Wythe Ave
Berry St
Bedford Ave
Driggs Ave
Roebling St
Havemeyer St
Metropolitan Ave
Broadway
Broadway
Division Ave
S 10th St
S 11th St
S 3rd St
S 4th St
S 2nd St
Grand St
N 1st St
N 3rd St
River St
Bedford Av
Marcy Av
Hewes St
Brooklyn Queens Expy
Rodney St
Borinquen Pl
Morton St
Clymer St
Taylor St
Ross St
Wilson St
Keap St
Hooper St
Penn St
Rutledge St
Lee Ave
Lynch St
Middleton St
Kay Ave
Gee Ave
Railroad Ave
Jay Ave
Assembly Rd
Washington Ave
Welding Rd
Market St
Paulding St
Flushing Ave
Flushing Ave
Front Ave
Dock Ave
Morris Ave
Chauncey Ave
West Way
East Way
278
278

Appendix D– Brownfield Cleanup Program Process



Note: CP Activities are in **Bold**

ATTACHMENT H
Resumes

ARIEL CZEMERINSKI, P.E.
P.O. Box 43
Albertson, NY 11507-0043
mobile (516) 987-1662
fax (516) 706-3214
Email: ariel@amc-engineering.com

SUMMARY:

New York State Professional Engineer. Results-oriented Chemical and Environmental Engineer, with 15 years of experience in the chemical and environmental areas. Areas of expertise include process control and automation, process optimization, productivity improvement, quality systems, environmental compliance, process and plant safety, and management of a production facility. A team player with excellent technical problem solving ability and strong communications skills. Registered PE in NY, IN, IL, and MI.

PROFESSIONAL EXPERIENCE:

1997-present AMC Engineering, PLLC. Roslyn Heights, NY.
Principal. Clients range from small car wash and Laundromat operators to multimillion-dollar chemical process companies.

- Engineering Consulting Services.
- Environmental Compliance, Permitting. Clean Water Act, Clean Air Act. Hazardous Materials.
- Chemical Process Design and Optimization. Process scale up.
- Wastewater Treatment systems.
- Design of cleaning compounds for the Transportation industry.
- Zoning regulations. Expediting Services. NYFD, NYC Buildings, NYSDEC, Suffolk County
- Safety and environmental training.
- Quality (ISO 9000) Management Systems: System auditing and implementation.
- Expert witness and testimony.

EDUCATION:
1988-1990 COLUMBIA UNIVERSITY, New York, NY M.S. Chemical Engineering, Feb. 1990.
Awarded Fellowship as a Teaching Assistant. Thesis: Optimal Periodic Control.

1981-1987 UNIVERSITY OF BUENOS AIRES, Buenos Aires, Argentina.
Chemical Engineer (six year program). Graduated in top 3% of class.
Teaching Assistant of Inorganic Chemistry. Thesis: Feasibility study for the production of pectin. Fats and Oils refinery plant.

Continuing Education Courses attended: (partial list)
Building Inspections Course
Environmental Regulation
Design of Chemical Reactors
Process Hazard Analysis
Hazardous Materials Regulations
CPR Training
Supervisors Training OSHA regulations ISO 9000
Lead auditor training Wastewater Treatment System

ADDITIONAL INFORMATION
Past Chairman of the New York Section, AIChE (American Institute of Chemical Engineers).
Fluent in Spanish.

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Charles B. Sosik, PG, PHG, Principal

Professional Experience

23 years

Education

MS, Hydrogeology, Adelphi University, NY
BS, Geology, Northern Arizona University, AZ

Areas of Expertise

- Brownfields
- Hazardous Waste Site Investigations
- Pre-purchase Site Evaluations and Support
- Regulatory Negotiations
- Remedial Planning and "Cost to Cure" Analysis
- Strategic Planning
- Real Estate Transactions
- NYC "E" Designations

Professional Certification

- Professional Geologist, NH
- Professional Geologist, Hydrogeologist, WA
- Licensed Site Professional (LSP), MA (in progress)
- OSHA 40-hr HAZMAT
- OSHA 8-hr. Supervisor

Professional Affiliation / Committees

- NYS Council of Professional Geologists (NYSCPG)
- Association of Groundwater Scientists & Engineers (AGSE)
- NYS RBCA Advisory Committee
- Massachusetts LSP Association
- New Hampshire Association of Professional Geologists
- Interstate Technology Regulatory Council/MTBE Team
- Environmental Business Association, Brownfields Task Force
- Part 375 Working Group

PROFILE

Mr. Sosik has 23 years of experience in contaminant release management. He specializes in advising clients on managing environmental compliance with federal, state, and municipal agencies and has successfully directed numerous investigation and remediation projects involving petroleum, pesticides, chlorinated solvents, heavy metals and radiologically activated media. His work included extensive three-dimensional investigations on MTBE, which have been used effectively to help shape public policy. He also has experience in applying models to groundwater related problems and has completed several large-scale projects to determine fate and transport of contaminants, establish spill scenarios, and closure criteria. His experience and expertise in the area of contaminant hydrogeology has resulted in requests from environmental attorneys, property owners and New York State to serve as an expert witness and technical advisor on a variety of legal disputes.

For the past 10 years Mr. Sosik has been primarily engaged in providing environmental consulting to developers responding to the extensive re-zoning of former industrial and commercial properties, which is currently taking place throughout New York City. These services include everything from pre-purchase evaluations and contract negotiations to gaining acceptance in and moving projects through the NYS Brownfields Program. Mr. Sosik has taken a pro-active role in the continued development of the NYS Brownfields Program and related policy, by attending numerous working seminars, active participation in work groups and task forces and by providing commentary to draft versions of new guidance documents. Throughout his professional career, Mr. Sosik has remained committed to developing innovative cost- efficient solutions to environmental issues, specifically tailored to the needs of his clients.

SELECTED PROJECTS

Scavenger Waste Treatment Facility (SWTF), Suffolk County, NY

Water Treatment Plant EIS - Focused EIS - In response to requests from the Suffolk County Council on Environmental Quality and the Brookhaven Conservation Advisory Council, Mr. Sosik prepared a focused EIS to evaluate the potential impacts to an important surface water resource from the proposed facility including cumulative and synergistic effects with established contaminant plumes in the area.

Advanced Residential Communities, Rockville Centre, NY

Brownfield Project – As the senior project manager on this large scale, high profile redevelopment project, Mr. Sosik was asked to develop a plan to accelerate the regulatory process in the face of general community opposition. Through numerous discussions with the BCP management team, He was able to condense the schedule and review period, through the submission of supporting documents (Investigation Report, Remedial Work Plan) with the BCP application package. Community opposition, which focused on the environmental condition of the site as a means to block the project, was used to advantage in expediting approval of the aggressive interim remedial plan. This will allow the developer to begin remedial work approximately 5 months ahead of schedule.

Former Temco Uniform site, West Haverstraw, NY

Brownfield Project – Mr. Sosik took over management of this project from another consultant following transition of this VCP site to the BCP. Mr. Sosik used the opportunity to renegotiate and revise the scope of work to allow a more cost effective and focused investigation plan without re-writing or resubmitting the RIWP. During the NYSDEC's review of the transition package, he met with and coordinated changes with the NYSDEC Project Manager to gain approval. The result saved the client a significant amount of money, but perhaps more importantly in this case, did so without loss of time.

Grovick Properties, Jackson Heights, NY

Brownfield Project – This Brownfield property is somewhat unique in that it had been investigated and partially remediated by the NYSDEC through the petroleum spill fund. The client was interested in purchasing the property and redeveloping it as office and retail space. Mr. Sosik reviewed the NYSDEC investigation and developed a

supplemental plan to meet the requirements of an RI under the BCP program. By performing this limited amount of field work "up-front" he was able to complete an RI Report and Remedial Plan and submit both with the BCP application package. The NYSDEC and NYSDOH approved the RI Report and the Remedial Plan with minor changes. This cut 120 days from the review process and allowed the client to arrange financing and move his project forward knowing what the clean-up costs would be at the outset.

Metro Management, Bronx, NY

Brownfield Project – The site of a former gas station, the developer had planned to construct a 12-story affordable housing apartment complex with first floor retail space. Since the site was located in an Environmental zone, potential tax credits of 22% for site development, remediation and tangible property could be realized under the BCP. In a pre-application meeting with the NYSDEC, Mr. Sosik realized that the department did not believe the site was eligible for the BCP, since it had been previously investigated and closed under the spills program.

Mr. Sosik assisted the developer in securing financing, and due to the demands of an aggressive construction schedule developed an Interim Remedial Measure (IRM), based on chemical oxidation treatment. Working closely with the clients environmental counsel, Mr. Sosik was able to get the IRM approved without a public comment period. Implementation of the IRM is currently underway.

The project was awarded the 2009 NYC Brownfield Award for Innovation.

Brandt Airflex, NY

Technical Consulting Services - Mr. Sosik provided senior level technical advice and strategic planning in developing an off-site RI/FS for the site, in negotiating a tax reduction for the property due to the environmental condition and in preparing a cost to cure estimate for settlement between business partners. After achieving a favorable tax consideration and settlement agreement for his client

Allied Aviation Services, Dallas, Fort Worth, Airport, Dallas, TX

Jet Fuel Investigation - Mr. Sosik developed and managed an investigative plan to quickly identify the extent and source of jet fuel which was discharging from the Airport's storm drain system to a creek a mile away. Through the use of a refined conceptual model, accelerated investigative techniques and a flexible work plan, he was able to identify the source of the fuel and the migration route within a single week. He then identifled remedial options and successfully negotiated a risk based plan with the Texas regulatory agency that had issued a notice of enforcement action against the facility.

KeySpan – Former LILCO Facilities, Various NY Locations

Pesticide Impact Evaluation - Mr. Sosik developed, negotiated and implemented a site screening procedure to evaluate impact to public health and the environment as the result of past herbicide use at 211 utility sites. Using an unsaturated zone leaching model (PRZM) on a small subset of the sites, he was able to establish mass loading schedules for the remaining sites. This was combined with public well data in a GIS environment to perform queries with respect to mass loading, time transport and proximity to vunerable public supply wells. Using this approach Mr. Sosik was able to show that there were no concerns for future impact. This effort satisfied the public health and resource concerns of the state environmental agency and county health department in a reasonable amount of time and at a fraction of the cost of a full scale investigation.

Former Computer Circuits (Superfund) Site, Hauppauge, NY

CERCLA RI/FS - As Senior Project Manager for the site, he played a major role in regaining control of the investigation activites for the PRP. This action prevented the USEPA from initiating an extensive investigation at the site using a RAC II contractor allowing the client to perform a more efficient investigation. He was involved in all negotiations with EPA and was the project lead in developing a revised site characterization plan (work plan, field sampling plan, quality assurance plan, etc.). By carefully managing all phases of the investigation and continued interaction with each of the three regulatory agencies involved, Mr. Sosik was able to keep the project focused and incrementally reinforce the clients position. The estimated cost of the revised investigation is expected to save the client 1.5 to 2 million dollars.

Sun Oil, Seaford, NY

Remediation Consuliting Services & Project Management - Under an atmosphere of regulatory distrust, political pressure and mounting public hostility toward the client, Mr. Sosik conducted an off-site 3-D investigation to define the extent of contamination and the potential impact on public health. By designing and implementing an aggressive source area remediation program and personal interaction with the public and regulatory agencies, he was able to successfully negotiate a limited off-site remediation favorable to the client. Source area remediation was completed within 6 months and the project successfully closed without damage to the client's public image or working relationship with the regulatory agencies.

Con Edison, Various Locations, NY

Hydrogeologic Consulting Services - Under a general consulting contract, Mr. Sosik conducted detailed subsurface hydrogeologic investigations at five locations to assist in the development of groundwater contingency planning. He also developed and implemented work plans to investigate and remediate existing petroleum, cable fluid, and PCB releases at many of the generating facilities and substations. An important aspect of his role was in assisting the client in strategic planning and negotiations with the regulatory agency.

Keyspan - Tuthill Substation, Aqueboque, NY

Accelerated Site Characterization - Using accelerated site characterization techniques, Mr. Sosik presented the project as a case study in establishing the transport of an herbacide and its metobolites aplied at utility sites in the 1980's The results were then used to establish a screening method for evaluating 211 similar sites controlled by the client in a reasonable and eficient manner.

NYSDEC Spill, East Moriches, NY

Spill Release Analysis - With recognized expertise in the area of gasoline plume development on Long Island, Mr. Sosik was asked by

Charles B. Sosik, PG, PHG, Principal

the State to establish the release date (and principal responsible party) of an extensive petroleum spill, which impacted a residential neighborhood. He used multiple lines of evidence, and a new EPA model (HSSM), which he has helped to refine, to reconstruct the release scenario and spill date, in support of the State Attorney General's cost recovery effort from the PRP.

Minmilt Realty, Farmingdale, NY

Fate & Transport Modeling - He completed an RI/FS at this location for a PCE plume that had been in transit for over 30 years. Mr. Sosik applied a conservative model to evaluate time/concentration impacts under a variety of transport scenarios to a municipal wellfield located 13,000 feet away. Through the use of the model and careful interpretation of an extensive data set compiled from several sources, Mr. Sosik was able to propose a plan which was both acceptable to the regulator and favorable to the client.

Sebonack Golf Course Project, Town of Southampton, NY

IPM Pesticide Study - Provided professional hydrogeologic services in support of the EIS prepared for the development of the site. The proposed development included an 18-hole golf course, clubhouse, dormitory facility, cottages, associated structures, and a 6,000 square foot research station for Southampton College. Mr. Sosik performed an extensive evaluation (using a pesticide-leaching model) on the effects of pesticide and nitrogen loading to groundwater as part of the projects commitment to an Integrated Pest Management (IPM) approach.

NYSDEC, Spills Division, Regions 1 – 4

Petroleum Spills Investigation & Remediation - As a prime contractor/consultant for the NYSDEC in Regions 1-4, Mr. Sosik has managed the investigation and remediation of numerous petroleum spills throughout the State. Many of these projects required the development of innovative investigation and remediation techniques to achieve project goals. He was also involved in many pilot projects and research studies to evaluate innovative investigation techniques such as accelerated site characterization, and alternative approaches to remediation such as monitored natural attenuation and risk based corrective action.

Sun Oil, E. Meadow, NY

Exposure Assessment - Performed to seek closure of the spill file, despite the presence of contaminants above standards, Mr. Sosik determined after the extended assessment that the level of remaining contamination would not pose a future threat to human health or the environment. He used multiple lines of evidence, and a fate and transport model to show that degradation processes would achieve standards within a reasonable time.

Sand & Gravel Mine, NY

Property Development - As part of the development of a sand and gravel mine, Mr. Sosik provided environmental consulting services to assist in obtaining a mining permit, which would result in the construction of a 150-acre lake. Specifically, Mr. Sosik investigated if the proposed lake would reduce groundwater quantity to domestic and public well fields, and/or accelerate the migration of potential surface contaminants to the lower part of the aquifer. After assuming the lead role in negotiations with the regulatory agency, Mr. Sosik was able to obtain a permit for the client by adequately addressing water quality and quantity issues, and by preparing a monitoring plan and spill response plan, acceptable to all parties.

NYSDEC, Mamaroneck, NY

Site Characterization / Source Identification - In a complex hydrogeologic setting consisting of contaminant transport through fractured metomorphic bedrock and variable overburden materials, Mr. Sosik was able to develop and implement a sub-surface investigation to differentiate and separate the impact associated with each of two sources. The results of this investigation were successful in encouraging the spiller to accept responsibility for the release.

Riverhead Municipal Water District, NY

Site Characterization / Remedial Planning - Using accelerated characterization techniques, he implemented a 3-D site investigation to identify two service stations 4,000 ft. away as the source of contamination impacting a municipal wellfield. In accordance with the strict time table imposed by the need to return the wellfield to production by early spring, he designed and implemented a multi-point (9 RW, 6 IW) recovery and injection well system using a 3-d numerical flow model, and completed the project on time. Using a contaminant transport model, Mr. Sosik developed clean-up goals which were achieved in 9 months of operation, well below the projected 3 to 5 year project duration.

Montauk Fire Department, NY

Site Assessment - Mr. Sosik performed a limited investigation and used a 2-D flow model to demonstrate that the property could not have been the source of contamination which had impacted an adjacent wellfield as per the results of a previous investigation. This small focused effort successfully reversed a $500,000, and rising, claim against the department by the water district and the NYSDEC.

PREVIOUS EXPERIENCE

P.W. Grosser Consulting, Bohemia, NY
Senior Project Manager, 1999-2006

Environmental Assessment & Remediation, Patchogue, NY
Senior Project Manager, 1994-1999

Miller Environmental Group, Calverton, NY
Project Manager, 1989-1994

DuPont Biosystems, Aston, PA
Hydrogeologist, 1988-1989

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Charles B. Sosik, PG, PHG, Principal

EXPERT WITNESS TESTIMONY AND DEPOSITIONS

Fact Witness -Testimony on relative age of petroleum spill based on nature and extent of residual and dissolved components at the Delta Service Station in Uniondale, NY Fall/1999

Expert Witness / Expert Report for defendant in cost recovery case by NYS Attorney General regarding a Class II Inactive Hazardous Waste (State Superfund) project by the NYSDEC (October 2004 – present, Report: March 2005, Deposition: April 2005)

Expert Witness / Fact Witness for plaintiff seeking compensation for partial expenses incurred during the investigation and remediation of a USEPA CERCLA site due to the release and migration of contaminants from an "upgradient" industrial property. (Deposition May 2005, case settled April 2007).

Expert Witness / Fact Witness for NYS Attorney General with respect to cost recovery for a NYSDEC petroleum spill site in Holtzville, NY (Deposition April 2005 - case settled).

Expert Witness – Statement of opinion and expert testimony at trial for plaintiff seeking damages from a major oil corporation for contamination under a prior leasing agreement in Rego Park, NY. Case decided in favor of plaintiff. Trial July 2007, in favor of Plaintiff. Qualified as Expert Witness.

Expert Witness / Fact Witness for NYS Attorney General with respect to cost recovery for a NYSDEC petroleum spill site in Lindenhurst, NY (Trial date December 2009, in favor of plaintiff. Qualified as Expert Witness.

Expert Witness / Fact Witness for defendant with respect to cost recovery and third party responsibility for a NYSDEC petroleum spill site. (Expert Statement of Fact – October 2005).

Expert Witness for plaintiff seeking damages related to a petroleum spill from the previous owner/operator of a gas station in College Point, NY. Case settled 2009.

Expert Witness for plaintiff (municipal water supply purveyor) seeking damages from major oil companies and manufacturer of MTBE at various locations in Suffolk County, NY. Expert reports July 2007, August 2007 and October 2007, Case settled August, 2008.

Expert Witness - Deposition for NYS Attorney General regarding NYSDEC cost recovery for a petroleum spill site at Sag Harbor, NY. August 2002

Expert Witness - for NYS Attorney General regarding NYSDEC cost recovery for a petroleum spill site at Riverhead, NY. Case settled July 2008.

Expert Witness for defendant responding to a claim from adjacent commercial property owner on the origin of chlorinated solvents on plaintiff's property located in Cedarhurst, NY. Expert opinion submitted to lead counsel on March 6, 2009, case settled April 2009.

Expert Report - for Attorney General on modeling performed to determine the spill release scenario at a NYSDEC petroleum spill site in East Moriches, NY. June 2000.

MODELING EXPERIENCE (PARTIAL LISTING)

PROJECT	MODEL	APPLICATION
Riverhead Water District, Riverhead, NY	MODFLOW, MODPATH	Remediation system design to intercept MTBE plume and prevent continued impact to municipal well field.
NYSDEC - Region 1, Holbrook, NY	MODFLOW, MODPATH	Simulate transport of MTBE plume to predict future impact.
NYSDEC - Region 1, East Moriches, NY	HSSM	Evaluate release scenario and start date of petroleum spill in support of cost recovery by NYS AG office.
AMOCO, Deer Park, NY	HSSM	Estimate release amount, start date and spill scenario to evaluate the potential for mass unaccounted for
Keyspan Energy, Nassau/Suffolk Counties Substations	PRZM	Estimate mass load of simazine used at 211 electric substations and screen sites according to potential for human health and ecological impacts.
Saboneck Golf Club, Southampton NY	PRZM	Estimate mass load of proposed pesticides on new golf course to evaluate acceptability under an IPM program.
Suffolk County Department of Public Works (SCDPW) Scavenger Waste Treatment Plant, Yaphank, NY	DYNFLOW, DYNTRAC	Evaluate time-transport and nitrogen impact on local river system.
SCDPW SUNY Waste Water Treatment Plant, Stony Brook, NY	DYNFLOW, DYNTRAC	Determine outfall location and time-transport of nitrogen from proposed upgrades to an existing wastewater treatment plant
Water Authority of Great Neck North Great Neck, NY	MODFLOW, MODPATH, MT3D	Review of modeling study performed by EPA to evaluate potential future impact to Well field from PCE plume. Identified serious flaws in model construction and implementation, which invalidated conclusions

PUBLICATIONS / PROFESSIONAL PAPERS

Smart Pump & Treat Strategy for MTBE Impacting a Public Water Supply (14th Annual Conference on Contaminated Soils Proceedings, 1998)

Transport & Transformation of BTEX & MTBE in a Sand Aquifer (Groundwater Monitoring & Remediation 05/1998)

Characteristics of Gasoline Releases in the Water Table Aquifer of Long Island (Petroleum Hydrocarbons Conference Proceedings, 1999)

Field Applications of the Hydrocarbon Spill Screening Model (HSSM) (USEPA Interactive Modeling Web Course www.epa.gov/athens/software/training/webcourse Authored module on model application and applied use of calculators, 02/2000)

Comparative Evaluation of MTBE Sites on Long Island, US EPA Workshop on MTBE Bioremediation (Cincinnati, 02/2000)

Comparison of Four MTBE Plumes in the Upper Glacial Aquifer of Long Island (American Geophysical Union, San Francisco, 12/1996)

Analysis and Simulation of the Gasoline Spill at East Patchogue, New York (American Geophysical Union, San Francisco, 12/1998)

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ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin R. Brussee, Project Manager

Professional Experience
EBC: January 2008
Prior: 6 years

Education
Bachelor of Science, Environmental Science, Plattsburgh State University, NY
Master of Science, Environmental Studies, University of Massachusetts, Lowell

Areas of Expertise
- Site Investigations NYC "E" Designations
- NYSDEC Spill Closure
- Gasoline/Fuel Oil Tank Removals
- NYC "E" Designations

Professional Certification
- OSHA 40-hr HAZWOPER
- OSHA 8-hr HAZWOPER Supervisor

PROFILE

Mr. Brussee has 10 years experience as an environmental consultant/contractor and has worked on and managed a wide range of environmental projects. Mr. Brussee has conducted Phase I, II and III Environmental Site Assessments for commercial, industrial, and residential properties in New York, New Jersey, Maryland and Delaware.

Mr. Brussee's field experience includes tank removal and installations, spill management and closure, soil and groundwater sampling, and both the oversight and operation of soil boring and well installation equipment. In addition, Mr. Brussee has performed project research, data reduction and evaluation, and has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

Eastern Environmental Solutions, Inc., Manorville, NY
Project Manager, 2006-2008

EA Engineering, Science & Technology
Hydrogeologist, 2005-2006

P.W. Grosser Consulting, Bohemia, NY
Field Hydrogeologist, 2002-2003

PUBLICATIONS

Chemical Stress Induced by Copper, Examination of a Biofilm System;
(Water Science Technology, 2006; 54(9): 191-199.)

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin Waters, Hydrogeologist

Professional Experience
EBC: October 2010
Prior: 5 years

Education
Bachelor of Science, Geology, SUNY Stony Brook

Areas of Expertise
- Soil and Groundwater Sampling
- NYSDEC Spill Closure
- Gasoline/Fuel Oil Tank Removals
- NYC "E" Designations

Professional Certification
- OSHA 40-hr HAZWOPER
- OSHA 8-hr HAZWOPER Supervisor

PROFILE

Mr. Waters has 7 years experience as an environmental consultant and has worked on a wide range of environmental projects. Mr. Waters has conducted Phase II and III Environmental Site Assessments for commercial, industrial, and residential properties in New York.

Mr. Waters' field experience includes soil, air and groundwater sampling, operations and maintenance of groundwater remediation systems, tank removals, spill management and closure, and oversight of monitoring well installations. In addition, Mr. Waters has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

P.W. Grosser Consulting, Bohemia, NY
Field/Project Hydrogeologist, 2003-2008

ATTACHMENT I
BCP Signage Specifications

SIGNS FOR REMEDIAL PROGRAMS

Instructions

Signs are required at sites where remedial activities are being performed under one of the following remedial programs: State Superfund, Voluntary Cleanup Program (VCP), Brownfield Cleanup Program (BCP), Environmental Restoration Program (ERP), Brownfield Opportunity Area (BOA) Program (note: activities under this program would be for investigation). The cost of the sign will be borne by the parties performing the remedial activities based on the legal document the activities are being performed under (i.e. volunteers/participants would pay 100% of the cost under the BCP; municipalities would be reimbursed for 90% of the cost under the ERP).

Sign Requirements

Size: **Horizontal format - 96" wide by 48" high**

Construction Materials: **Aluminum or wood blank sign boards with vinyl sheeting.**

Inserts: **"Site Name", "Site Number", "Name of Party Performing Remedial Activities" and "Municipal Executive".**
Indicate position, size and topography for specific inserts.

Color Scheme: **Copy surrounding DEC logo - "NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" - PMS 355**

DEC logo: **PMS 301 Blue**
PMS 355 Green

Text:

Program (choose one):	**PMS 301**
Brownfield Cleanup Program	
Voluntary Cleanup Program	
Brownfield Opportunity Areas Program	
Petroleum Remediation Program	
State Superfund Program	
1996 Clean Water/Clean Air Bond Act - Environmental Restoration Program	
Site Name, Site Number, Party Performing Remedial Activities	**PMS 355**
Names of Governor, Commissioner, Municipal Executive	**PMS 301**
Transform the Past.....Build for the Future	**PMS 355**

Type Specifications: **All type is Caslon 540, with the exception of the logotype.**
Format is: center each line of copy with small caps and initial caps.

Production Notes: **96" wide x 48" high aluminum blanks will be covered with vinyl sheeting to achieve background color. Copy and logo will be silk screened on this surface.**

See attached format

New York State Brownfields Cleanup Program

Former Domsey Fiber Corp Site
BCP Site No. C-224158
Wythe and Kent Realty LLC

Governor Andrew M. Cuomo
NYSDEC Commissioner Joe Martens
Mayor Michael R. Bloomberg

Transform the Past. Build for the Future.

ATTACHMENT J
Estimated Remedial Costs

TABLE 1
FORMER DONSEY FIBER CORP SITE
431 Kent Avenue
Brooklyn, NY

Summary of Project Costs

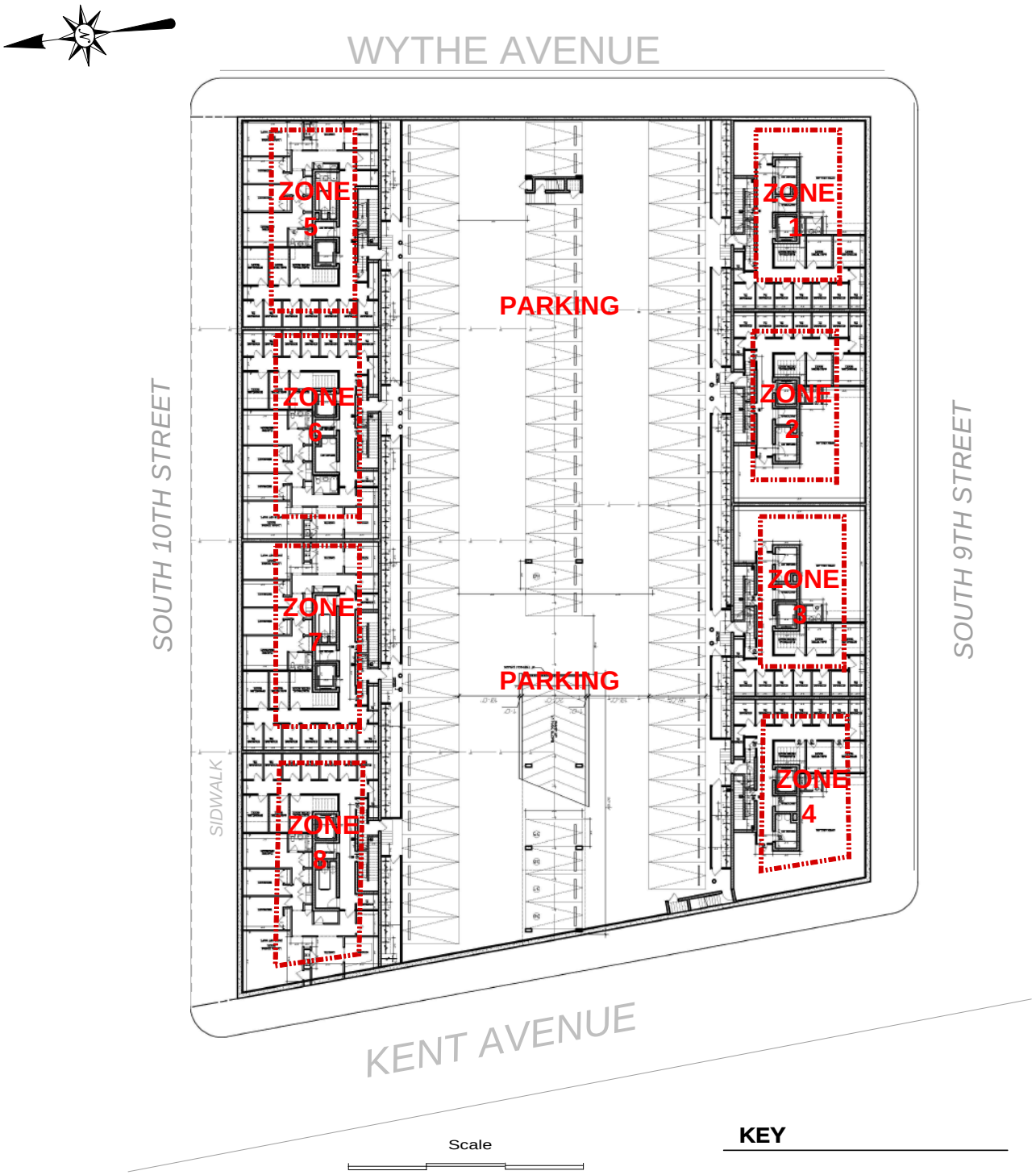
TASK	Alternative 1 Costs by Task	Alternative 2 Costs by Task	Alternative 3 Costs by Task
BCP Entry Documents	$ 25,100.00	$ 25,100.00	$ 25,100.00
Supplemental Investigation and RI Report	$ 74,100.00	$ 74,100.00	$ 74,100.00
Remedial Work Plan, Remedy Scoping & Coordination	$ 20,250.00	$ 20,250.00	$ 20,250.00
Remedial Program Implementation	$ 3,717,350.00	$ 3,549,150.00	$ 3,549,150.00
Final Engineering Report, Site Management Plan & IC/ECs	$ 108,500.00	$ 108,500.00	$ 108,500.00
Site Management - Operation and Maintenance Program	$ 47,250.00	$ 47,250.00	$ 47,250.00
Subtotal	$ 3,992,550.00	$ 3,824,350.00	$ 3,824,350.00
15% Contingency	$ 598,882.50	$ 573,652.50	$ 573,652.50
Total	**$ 4,591,432.50**	**$ 4,398,002.50**	**$ 4,398,002.50**

ATTACHMENT K
SSDS Specifications

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

FORMER DOMSEY FIBER CORP.
431 KENT AVENUE, BROOKLYN, NY

PARCEL A SUB SLAB DEPRESSURIZATION SYSTEM



Scale

0 25 50 75

1 Inch = 50 Feet

KEY

4" HPDE Venting Line

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

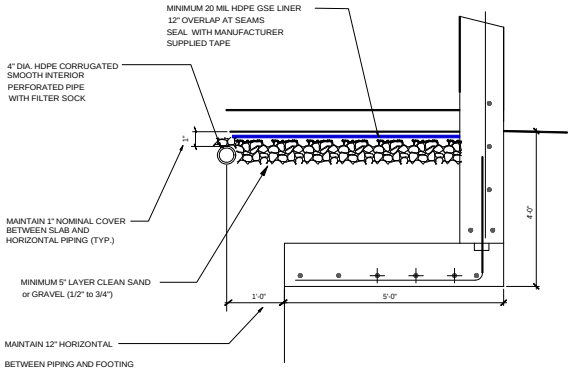
FORMER DOMSEY FIBER CORP.
431 KENT AVENUE, BROOKLYN, NY

PARCEL B SUB SLAB DEPRESSURIZATION SYSTEM

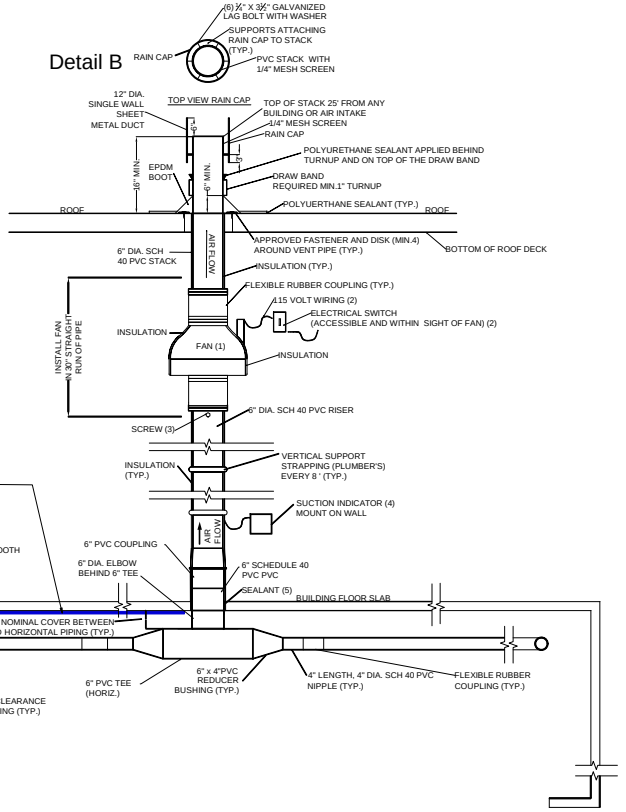
NOTES:

1. FAN TO BE RADONAWAY HIGH-FLOW IN-LINE FAN, MODEL RP 265, OR APPROVED EQUAL.
2. FAN AND ON/OFF SWITCH TO BE HARD-WIRED TOGETHER TO 115 VOLT CIRCUIT.
3. SECURE RUBBER COUPLING WITH SCREW TO PREVENT FAN ASSEMBLY FROM SLIPPING DOWN VERTICAL PIPE.
4. DWYER MAGNAHELIC DIAL TYPE VACUUM GAUGE MODEL 2002-M OR APPROVED EQUAL.
5. SEAL OPENING WITH ELASTOMERIC JOINT SEALANT AS DEFINED IN ASTM C920.
6. HIGH DENSITY POLYETHYLENE CORRUGATED PERFORATED PIPE WITH SMOOTH INTERIOR WATERWAY. ADS N-12 OR APPROVED EQUAL.
7. WRAP 4' HDPE PIPE WITH GEOTEXTILE FABRIC, GSE NW4 OR APPROVED EQUAL.
8. EBC MUST PRE-APPROVE ALL FILLMATERIAL BEFORE DELIVERY TO SITE.

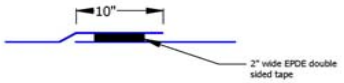
Detail A



Detail B

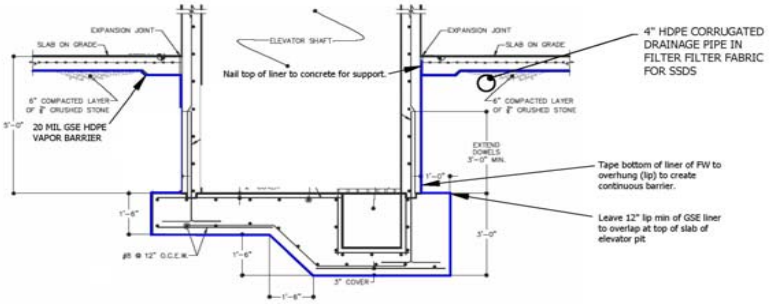


Detail C



20 mil HDPE liner Overlap Detail

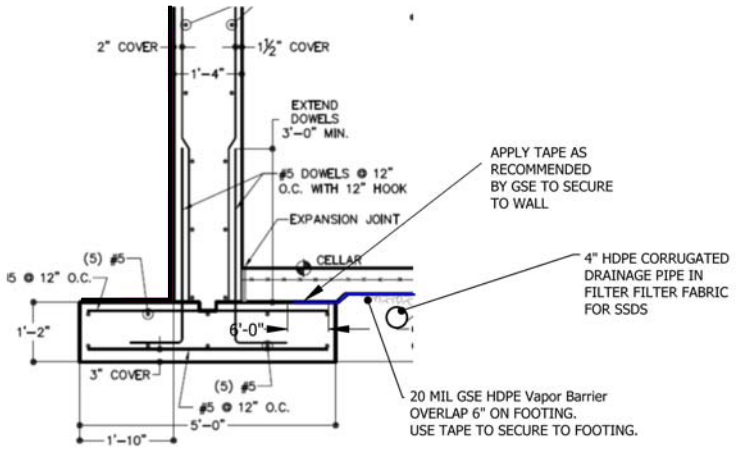
N.T.S.



EVEVATOR PIT DETAIL

Detail D

Detail E



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ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

FORMER DOMSEY FIBER CORP.
431 KENT AVENUE, BROOKLYN, NY

SUB SLAB DEPRESSURIZATION SYSTEM DETAILS

Vapor Barrier Design and Installation

A vapor barrier is being recommended for this project as a preventative measure. This section includes the specifications and guidelines for installing a below concrete slab sheet vapor barrier. The vapor barrier will extend throughout the area to be occupied by the new multi-use building to be constructed on the site. Vapor barrier seams, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer's recommendations and instructions.

A vapor retarder or barrier, by definition, is a material or assembly of materials that resists vapor diffusion through it. For this project the sheet material will consist of a black high-density polyethylene (HDPE) film, 20 mil thick.

ASTM references for vapor barriers include the following:

1. ASTM E 1745-97 "Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs."

2. ASTM E 1643-98 "Standard Practice for Vapor Barriers."

Materials
The minimum values for the HDPE film will meet the following:

Property	Test Method	Minimum Values
Thickness, mil (mm)	ASTM D 5199	20
Density, g/cm3	ASTM D 1505	0.94
Carbon Black Content, %	ASTM D 1603, mod.	2.0
Tensile Properties (each direction)	ASTM D 6693	
Strength at Yield, lb/in. (kN/m)		22
Strength at Break, lb/in. (kN/m)		44
Elongation at Yield, %	(1.3" gauge length)	10
Elongation at Break, %	(2.0" gauge length)	500
Tear Resistance, lb (N)	ASTM D 1004	5
Puncture Resistance, lb (N)	ASTM D 4833	26
Notched Constant Tensile Load, hours	ASTM D 5397, app.	400
Oxidative Induction Time, min.	ASTM D 3895	100

The manufacturer of the specified liner is: GSE LINING TECHNOLOGY, INC.

1. All joints in the HDPE sheeting will be sealed with either a tape seal or a weld seal. The tape seal consists of a butyl mastic self-adhering tape, 2 inch (50 mm) wide, compatible with the sheet material.
2. The weld seal consists of an extrudate rod or bead, compatible with sheet material.

Preparation for the installation of the vapor barrier membrane is as follows:

3. Do not install vapor retarder/barrier until items penetrating it are in place.
4. Rake, trim, and tamp surfaces over which membrane is to be installed.
5. Substrates must be regular and smooth with no gaps or voids greater than 0.5 inches (12 mm).
6. The substrate must be free of loose aggregate and sharp protrusions.
7. The substrate does not need to be dry, but standing water must be removed.

Membrane Installation

Place the membrane HDPE film side to the substrate with printed coating side up facing towards the concrete pour. Lay membrane with seams perpendicular to and lapped in direction of concrete pour.

End laps should be staggered to avoid a build-up of layers. Accurately position succeeding sheets to overlap the previous sheet 3 inches (75 mm). Ensure that the underside of the succeeding sheet is clean, dry, and free from contamination before attempting to overlap.

If manufacturer recommends sealing overlaps with tape, proceed with the following steps:

8. Secure overlaps to the bottom sheet with tape.

9. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. During cold or damp conditions, the tape adhesive can be gently warmed using a hot air gun or similar to remove moisture or condensation and improve initial adhesion.

10. If manufacturer recommends sealing overlaps by welding, weld overlap seams according to manufacturer's instructions.

11. Penetrations through the membrane such as utility conduits, can be sealed either using the tape and liquid membrane method or the extrusion weld method.

Procedures for sealing penetrations using the tape and seal method include the following:

12. Scribe membrane tight to the penetration.
13. If the membrane is not within 0.5 inches (12 mm) of the penetration, apply tape to cover the gap.
14. Wrap the penetration with tape by positioning the tape 0.5 inches (12 mm) above the membrane.
15. Mix and apply Liquid Membrane around the penetrations using a fillet to provide a watertight seal between the membrane and tape.

Procedures for sealing penetrations using the extrusion weld method include the following:

Scribe membrane tight to the penetration.

16. Perform extrusion weld techniques according to manufacturer's instructions.

Protection

Protect membrane from damage until permanent covering is in place.

Membrane Repair
The membrane can be repaired using either the tape method or the weld method.

The procedure to repair the membrane using the tape method is as follows:

- Repair punctures and tears in membrane using patches of the material and overlapping the puncture or tear a minimum of 12 inches.

- Seal with tape.

The procedure to repair the membrane using the weld method is as follows:

- Repair punctures and tears in membrane using patches of the material and overlapping the puncture or tear a minimum of 6 inches. Seal with extrusion weld.

Inspection
Upon completion of the installation of the membrane, the Contractor shall coordinate an inspection with the Engineer or its designated representative. The membrane shall not be covered until the Contractor receives written approval from the Engineer.

Pouring of Concrete
It is recommended that concrete be poured within 56 days of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Technical Note

Permeability For GSE Geomembranes

Due to its chemical structure, polyethylene is an (essentially) impermeable substance. The material is made up of very long molecules. There does exist, however, molecular voids (sometimes referred to as "free space") among the individual polyethylene chains. The existence of these spaces is recognized when we say polyethylene is essentially impermeable. Permeation may exist when, for instance, the pressure behind the permeant is very high or the permeant's molecular size is very small. However, the degree of permeation exhibited is difficult to determine using currently available test procedures. As a result, test results frequently reflect the inaccuracy of the procedure rather than the permeation of the material. Testing of GSE HDPE performed by an independent laboratory produced the following results.

Test	ASTM Method	Results
Methane Permeability	D 1434	2.0 x 10-6 mL/cm²·s
Water Vapor Permeability	E 96	1.7 x 10-9 mL/cm²·s

It must be emphasized that different chemicals will permeate at different rates due to differences in molecular shape, polarity and phase (gas or liquid). For example, the relatively small water molecule (atomic weight 18) will more easily permeate the polyethylene matrix as compared to a large molecule such as cyclohexanol (atomic weight 94).

The molecules' polarity must also be considered (recall the adage "like dissolves like"). Polyethylene is a non-polar molecule, therefore other non-polar molecules will permeate the matrix better. Examples of these molecules are hydrocarbons - especially those such as octane, pentane and hexene. The permeation of these are therefore greater than for polar molecules such as water.

A sometimes overlooked factor when reviewing permeation data is that most permeameters apply pressure to encourage permeation. In geotechnical and environmental applications, geomembranes are not subjected to the high pressures of potential permeants as they are in a permeation laboratory test. The lack of a driving force greatly diminishes actual permeation since the gaseous molecules find an easier path to follow than through the polyethylene liner. Also, because of the high pressures required to force permeants through polyethylene, failure of the permeameter is common. This is commonly in the form of a test apparatus leak. Such leaks can result in erroneous results.

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Technical Note

Chemical Resistance For GSE Geomembranes

GSE geomembranes are made of high quality, virgin polyethylene which demonstrates excellent chemical resistance. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. It is this property of (HDPE) high density polyethylene geomembranes that makes it the lining material of choice.

In order to gauge the durability of a material in contact with a chemical mixture, testing is required in which the material is exposed to the chemical environment in question. Chemical resistance testing is a very large and complex topic because of two factors. First, the number of specific media is virtually endless and second, there are many criteria such as tensile strength, hardness, etc. that may be used to assess a material's resistance to degradation.

The chemical resistance of polyethylene has been investigated by many people over the past few decades. We are able to draw from that work when making statements about the chemical resistance of today's polyethylene geomembranes. In addition to that, many tests have been performed that specifically use geomembranes and certain chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for. As a result of these factors, GSE published a chemical resistance chart, demonstrating general guidelines.

Polyethylene is, for practical purposes, considered impermeable. Be aware, however, that all materials are permeable to some extent. Permeability varies with concentration, temperature, pressure and type of permeant. The rates of permeation are usually so low, however, that they are insignificant. As a point of reference, polyethylene is commonly used for packaging of several types of materials. These include gasoline, motor oil, household cleaners (i.e. bleach), muratic acid, pesticides, insecticides, fungicides, and other highly concentrated chemicals. Also, you should be aware that there are some chemicals which may be absorbed by the material but only when present at very high concentrations. These include halogenated and/or aromatic hydrocarbons at greater than 50%; their absorption results in swelling and slight changes in physical properties such as increased tensile elongations. This includes many types of fuels and oils. Recognize that this action, however, does not affect the liner's ability to act as a barrier for the material it is containing.

Since polyethylene is a petroleum product, it can absorb other petroleum products. Like a sponge, the material becomes slightly thicker and more flexible but does not produce a hole or void. However, unlike a sponge, this absorption is not immediate. It takes a much longer time for a polyethylene liner to swell than it does for a sponge. The exact time it takes for swelling to occur depends on the particular constituents and concentrations of the contained media. However, a hole would not be produced. Also, this absorption is reversible and the material will essentially return to it's original state when the chemical is no longer in contact with the liner.

With regard to typical municipal landfills in the United States, legally allowable levels of chemicals have been demonstrated to have no adverse affect on polyethylene geomembrane performance. The very low levels of salts, metals and organic compounds do not damage polyethylene. A double-lined containment with a leachate (leak detection) removal system effectively prevents any significant, continuous exposure of the secondary membrane to these materials and for practical purposes makes the total liner system even more impermeable.

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Technical Note

Chemical Resistance Chart

GSE is the world's leading supplier of high quality, polyethylene geomembranes. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. Note that the effect of chemicals on any material is influenced by a number of variable factors such as temperature, concentration, exposed area and duration. Many tests have been performed that use geomembranes and certain specific chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for, and various criteria may be used to judge performance. Reported performance ratings may not apply to all applications of a given material in the same chemical. Therefore, these ratings are offered as a guide only. This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information.

Medium	Concentration	Resistance at: 20 °C (68 °F)	60 °C (140 °F)
A			
Acetic acid	100%	S	L
Acetic acid	10%	S	S
Acetic acid anhydride	100%	S	L
Acetone	100%	L	L
Adipic acid	sat. sol.	S	S
Allyl alcohol	96%	S	S
Aluminum chloride	sat. sol.	S	S
Aluminum fluoride	sat. sol.	S	S
Aluminum sulfate	sat. sol.	S	S
Alum	sol.	S	S
Ammonia, aqueous	dil. sol.	S	S
Ammonia, gaseous dry	100%	S	S
Ammonia, liquid	100%	S	S
Ammonium chloride	sat. sol.	S	S
Ammonium fluoride	sol.	S	S
Ammonium nitrate	sat. sol.	S	S
Ammonium sulfate	sat. sol.	S	S
Ammonium sulfide	sol.	S	S
Amyl acetate	100%	S	L
Amyl alcohol	100%	S	L
Aniline	100%	S	L
Antimony trichloride	90%	S	S
Arsenic acid	sat. sol.	S	S
Aqua regia	HCI-HNO3	U	U
B			
Barium carbonate	sat. sol.	S	S
Barium chloride	sat. sol.	S	S
Barium hydroxide	sat. sol.	S	S
Barium sulfate	sat. sol.	S	S
Barium sulfide	sol.	S	S
Benzaldehyde	100%	S	L
Benzene	—	L	L
Benzoic acid	sat. sol.	S	S
Beer	—	S	S
Borax (sodium tetraborate)	sat. sol.	S	S
Boric acid	sat. sol.	S	S
Bromine, gaseous dry	100%	U	U
Bromine, liquid	100%	U	U
Butane, gaseous	100%	S	S
1-Butanol	100%	S	S
Butyric acid	100%	S	L
C			
Calcium carbonate	sat. sol.	S	S
Calcium chlorate	sat. sol.	S	S
Calcium chloride	sat. sol.	S	S
Calcium nitrate	sat. sol.	S	S
Calcium sulfate	sat. sol.	S	S
Calcium sulfide	dil. sol.	L	L
Carbon dioxide, gaseous dry	100%	S	S
Carbon disulfide	100%	L	U
Carbon monoxide	100%	S	S
Chloracetic acid	sol.	S	S
Carbon tetrachloride	100%	L	U
Chlorine, aqueous solution	sat. sol.	L	U
Chlorine, gaseous dry	100%	L	U
Chloroform	100%	U	U
Chromic acid	20%	S	L
Chromic acid	50%	S	L
Citric acid	sat. sol.	S	S

Medium	Concentration	Resistance at: 20 °C (68 °F)	60 °C (140 °F)
Copper chloride	sat. sol.	S	S
Copper nitrate	sat. sol.	S	S
Copper sulfate	sat. sol.	S	S
Cresylic acid	sat. sol.	L	—
Cyclohexanol	100%	S	S
Cyclohexanone	100%	S	L
D			
Decahydronaphthalene	100%	S	L
Dextrine	sol.	S	S
Diethyl ether	100%	L	—
Dioctylphthalate	100%	S	L
Dioxane	100%	S	S
E			
Ethanediol	100%	S	S
Ethanol	40%	S	L
Ethyl acetate	100%	S	U
Ethylene trichloride	100%	U	U
F			
Ferric chloride	sat. sol.	S	S
Ferric nitrate	sol.	S	S
Ferric sulfate	sat. sol.	S	S
Ferrous chloride	sat. sol.	S	S
Ferrous sulfate	sat. sol.	S	S
Fluorine, gaseous	100%	U	U
Fluorosilicic acid	40%	S	S
Formaldehyde	40%	S	S
Formic acid	50%	S	S
Formic acid	98-100%	S	S
Furfuryl alcohol	100%	S	L
G			
Gasoline	—	S	L
Glacial acetic acid	96%	S	L
Glucose	sat. sol.	S	S
Glycerine	100%	S	S
Glycol	sol.	S	S
H			
Heptane	100%	S	U
Hydrobromic acid	50%	S	S
Hydrobromic acid	100%	S	S
Hydrochloric acid	10%	S	S
Hydrochloric acid	35%	S	S
Hydrocyanic acid	10%	S	S
Hydrofluoric acid	4%	S	S
Hydrofluoric acid	60%	S	L
Hydrogen	100%	S	S
Hydrogen peroxide	30%	S	L
Hydrogen peroxide	90%	S	U
Hydrogen sulfide, gaseous	100%	S	S
L			
Lactic acid	100%	S	S
Lead acetate	sat. sol.	S	—
M			
Magnesium carbonate	sat. sol.	S	S
Magnesium chloride	sat. sol.	S	S
Magnesium hydroxide	sat. sol.	S	S
Magnesium nitrate	sat. sol.	S	S
Maleic acid	sat. sol.	S	S
Mercuric chloride	sat. sol.	S	S

- Continued -

Medium	Concentration	Resistance at: 20 °C (68 °F)	60 °C (140 °F)
Mercuric cyanide	sat. sol.	S	S
Mercuric nitrate	sol.	S	S
Mercury	100%	S	S
Methanol	100%	S	S
Methylene chloride	100%	L	—
Milk	—	S	S
Molasses	—	S	S
N			
Nickel chloride	sat. sol.	S	S
Nickel nitrate	sat. sol.	S	S
Nickel sulfate	sat. sol.	S	S
Nicotinic acid	dil. sol.	S	—
Nitric acid	25%	S	S
Nitric acid	50%	S	U
Nitric acid	75%	U	U
Nitric acid	100%	U	U
O			
Oils and Grease	—	S	L
Oleic acid	100%	S	L
Orthophosphoric acid	50%	S	S
Orthophosphoric acid	95%	S	L
Oxalic acid	sat. sol.	S	S
Oxygen	100%	S	L
Ozone	100%	L	U
P			
Petroleum (kerosene)	—	S	L
Phenol	sol.	S	S
Phosphorus trichloride	100%	S	L
Photographic developer	cust. conc.	S	S
Picric acid	sat. sol.	S	—
Potassium bicarbonate	sat. sol.	S	S
Potassium bisulfide	sol.	S	S
Potassium bromate	sat. sol.	S	S
Potassium bromide	sat. sol.	S	S
Potassium carbonate	sat. sol.	S	S
Potassium chlorate	sat. sol.	S	S
Potassium chloride	sat. sol.	S	S
Potassium chromate	sat. sol.	S	S
Potassium cyanide	sol.	S	S
Potassium dichromate	sat. sol.	S	S
Potassium ferricyanide	sat. sol.	S	S
Potassium ferrocyanide	sat. sol.	S	S
Potassium fluoride	sat. sol.	S	S
Potassium hydroxide	10%	S	S
Potassium hydroxide	sol.	S	S
Potassium hypochlorite	sol.	S	L
Potassium nitrate	sat. sol.	S	S
Potassium orthophosphate	sat. sol.	S	S
Potassium perchlorate	sat. sol.	S	S
Potassium permanganate	20%	S	S
Potassium persulfate	sat. sol.	S	S
Potassium sulfate	sat. sol.	S	S
Potassium sulfite	sol.	S	S
Propionic acid	50%	S	S
Propionic acid	100%	S	L
Pyridine	100%	S	L
Q			
Quinol (Hydroquinone)	sat. sol.	S	S
S			
Salicylic acid	sat. sol.	S	S
Silver acetate	sat. sol.	S	S
Silver cyanide	sat. sol.	S	S
Silver nitrate	sat. sol.	S	S
Sodium benzoate	sat. sol.	S	S
Sodium bicarbonate	sat. sol.	S	S
Sodium biphosphate	sat. sol.	S	S
Sodium bisulfite	sol.	S	S
Sodium bromide	sat. sol.	S	S
Sodium carbonate	sat. sol.	S	S
Sodium chlorate	sat. sol.	S	S
Sodium chloride	sat. sol.	S	S
Sodium cyanide	sat. sol.	S	S
Sodium ferricyanide	sat. sol.	S	S
Sodium ferrocyanide	sat. sol.	S	S
Sodium fluoride	sat. sol.	S	S
Sodium hydroxide	40%	S	S
Sodium hydroxide	sat. sol.	S	S
Sodium hypochlorite	15% active chlorine	S	S
Sodium nitrate	sat. sol.	S	S
Sodium nitrite	sat. sol.	S	S
Sodium orthophosphate	sat. sol.	S	S
Sodium sulfate	sat. sol.	S	S
Sodium sulfide	sat. sol.	S	S
Sulfur dioxide, dry	100%	S	S
Sulfur trioxide	100%	U	U
Sulfuric acid	10%	S	S
Sulfuric acid	50%	S	S
Sulfuric acid	98%	S	U
Sulfuric acid	fuming	U	U
Sulfurous acid	30%	S	S
T			
Tannic acid	sol.	S	S
Tartaric acid	sol.	S	S
Thionyl chloride	100%	L	U
Toluene	100%	L	U
Triethylamine	sol.	S	L
U			
Urea	sol.	S	S
Urine	—	S	S
W			
Water	—	S	S
Wine vinegar	—	S	S
Wines and liquors	—	S	S
X			
Xylenes	100%	L	U
Y			
Yeast	sol.	S	S
Z			
Zinc carbonate	sat. sol.	S	S
Zinc chloride	sat. sol.	S	S
Zinc (II) chloride	sat. sol.	S	S
Zinc (IV) chloride	sat. sol.	S	S
Zinc oxide	sat. sol.	S	S
Zinc sulfate	sat. sol.	S	S

Specific immersion testing should be undertaken to ascertain the suitability of chemicals not listed above with reference to special requirements.

NOTES:

(S) Satisfactory: *Liner material is resistant to the given reagent at the given concentration and temperature. No mechanical or chemical degradation is observed.*

(L) Limited Application Possible: *Liner material may reflect some attack. Factors such as concentration, pressure and temperature directly affect liner performance against the given media. Application, however, is possible under less severe conditions, e.g. lower concentration, secondary containment, additional liner protections, etc.*

(U) Unsatisfactory: ***Liner material is not resistant to the given reagent at the given concentration and temperature. Mechanical and/or chemical degradation is observed.***

(–) Not tested

sat. sol. = *Saturated aqueous solution, prepared at 20°C (68°F)*

sol. = *aqueous solution with concentration above 10% but below saturation level*

dil. sol. = *diluted aqueous solution with concentration below 10%*

cust. conc. = *customary service concentration*

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