NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Phase I Remedial Investigation Report

Former Sterling Transformer Corp. Off-Site

(NYSDEC Site Number 224203A)

NYSDEC STANDBY ENGINEERING CONTRACT

Work Assignment #D007625-44

PREPARED FOR:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
c-1,2-DCE	cis-1,2-dichloroethene
COC	contaminants of concern
DI	deionized
DUSR	data usability summary report
DVS	Data Validation Services
EB	equipment blank
FD	field duplicate
FS	feasibility study
GPR	ground penetrating radar
GWQS	Groundwater Quality Standards
HDR	Henningson, Durham & Richardson, Architecture and Engineering, P.C.
HASP	health and safety plan
ID	inside diameter
IDW	investigative derived waste
IRM	Interim remedial measures
MGP	manufactured gas plant
MNA	monitored natural attenuation
msl	mean sea level
MTBE	methyl tertiary butyl ether
ng/l	nanograms per liter
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OD	outside diameter
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PID	photoionization detector
PPE	personal protective equipment
ppb	parts per billion
ppt	parts per trillion
RI	remedial investigation
SCGs	standards, criteria and guidance
SCO	soil cleanup objective
SVOCs	semi-volatile organic compounds

TB	trip blank
TCE	trichloroethene
TOGS	Technical and Administrative Guidance Series
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VOC	volatile organic compounds

1.0 Introduction

This Phase I Remedial Investigation (RI) Report for the Former Sterling Transformer Corp. Off-Site (NYSDEC Site No. 224203A) was prepared by Henningson, Durham & Richardson, Architecture and Engineering, P.C. (HDR) as part of New York State Department of Environmental Conservation (NYSDEC) Contract D007625, Work Assignment #44. The on-site investigation is addressed by others under the Brownfield Cleanup Program (BCP) as NYSDEC Site #C224203. This report summarize historic environmental data that exists for the site and characterizes and delineates the extent of the off-site subsurface contamination. HDR conducted the Phase I RI off-site field activities in 2018 and 2019.

1.1 Background

The Former Sterling Transformer Corp. site (NYSDEC Site No. 224203A) is located at 510-528 Driggs Avenue in the Williamsburg section of Kings County (Borough of the Brooklyn, New York City). Figure 1 provides the on-site area location map. Tax information shows that the site is Block 2312, Lot 23, and is currently owned by 187 North 8th Street Owner LLC. Based on information from the New York City Department of Buildings (NYCDOB), the Department of Finance Building Classification for 510 Driggs Avenue is a garage/manufactured gas plant (MGP) station.

The on-site area covers 0.4 acres and is on the northwest side of Driggs Avenue between North 8th Street to the south and Lot 22 followed by North 9th Street to the north. It is zoned as mixed use – (MX-8), but is currently a vacant lot covered with asphalt and surrounded with a chain-link fence. The surrounding land is mixed-use, with residences next to the on-site area to the northwest, and commercial establishments to the southwest, southeast and northeast. Figure 2 shows the site with surrounding features.

Based on the NYCDOB records, the former building at 510 Driggs Avenue was used as a parking lot in 2009 or earlier, as a permit application for a new parking lot with an attendant booth was submitted on June 30, 2009 and approved on November 6, 2009. Historic aerial photographs show a building at the on-site area from pre-1954 through 2006 and a vacant lot in 2008 and 2009. The historic aerial photographs show the parking lot at the on-site area in 2011.

1.2 Phase I Remedial Investigation Objectives

The Phase I RI was developed to determine the nature and extent of the contamination originating from the on-site area.

The Phase I RI objectives were to:

- Conduct data and information reviews (including available document reviews, site visits);

- Coordinate and manage subcontractors (surveyors, analytical laboratories, drilling subcontractors, data validators) for investigation purposes;
- Describe off-site area sampling events and interpretations of resulting data (including historic investigations and data) which may be used to further assess or delineate contamination;
- Identify the needs for supplemental investigation activities at the off-site area;
- Assess potential interim remedial measures (IRMs) and remedial actions that can be considered for specific off-site locations.

1.3 Report Organization

This Phase I RI report summarizes historic site investigation findings and the Phase I RI activities conducted at the off-site area to date.

This Phase I RI Report is organized as follows:

- Section 1 introduces the report and provides on-site area background information and Phase I RI objectives;
- Section 2 summarizes previous investigations at the on-site area;
- Section 3 discusses the Phase I RI field program implemented in 2018 at the off-site area;
- Section 4 describes the physical characteristics (surface hydrology, geology, and surrounding land use);
- Section 5 discusses the Phase I RI sampling results and applicable criteria for interpreting the data; and
- Section 6 presents conclusions and recommendations for future work.

2.0 Summary of Previous Investigations and Remedial Actions

The following historic information about the on-site area was received from NYSDEC and reviewed by HDR for the Phase I RI:

- BCP Significant Threat Determination Report (NYSDEC; September 1, 2016).

Other information obtained from online sources include:

- Supplemental Geotechnical Report, 510 Driggs Avenue (Ancora Engineering; July 6, 2018)

Appendix A provides these documents as references.

2.1 BCP Significant Threat Determination Report

The BCP Significant Threat Determination Report (Appendix A.1) prepared by NYSDEC (September 1, 2016) provides a site description, contaminants of concern, site environmental assessment, site health assessment and remedy description for the on-site area.

The on-site area was historically used as a MGP, which was torn down before 1887. Subsequently, the on-site area was developed with a garage, then converted to a chair manufacturing facility. Around 1965, a transformer manufacturer occupied the on-site area, followed by a food warehouse around 1991. In 2006, the on-site area buildings were torn down and the on-site area became a parking lot.

The significant threat determination report identified the following contaminants of concern (COCs) at the on-site area:

- naphthalene
- cis-1,2-dichloroethene
- vinyl chloride
- benzo(a)anthracene
- benzo(b)pyrene
- benzo(b)fluoranthene
- chrysene
- dibenz(a,h)anthracene
- indeno(1,2,3-cd)pyrene
- benzene

Quantities of these COCs that were released to the environment are unknown. The COCs are based on groundwater, soil, and soil vapor analytical data.

The site environmental assessment is based on a RI that occurred in 2015. Soil impacted by chlorinated and petroleum volatile organic compounds (VOCs) at concentrations above the unrestricted use soil cleanup objectives (SCOs) were identified in the southern portion of the on-site area. Soil impacted by semi-volatile organic compounds (SVOCs) at concentrations above the restricted residential SCOs were detected throughout the on-site area at all sampled depths. The SVOCs included the COCs identified above.

Chlorinated VOCs in groundwater were detected in all on-site area wells at concentrations above the ambient groundwater quality standards (GWQS). The chlorinated VOCs included cis-1,2-dichloroethene at concentrations up to 1,200 parts per billion (ppb). Benzene was also detected above its GWQS in the southern part of the on-site area. Off-site impacts were deemed likely based on the distribution of COCs detected in the on-site groundwater samples.

Chlorinated solvents were detected in all samples collected from the on-site area, with the greatest concentrations detected in the eastern portion. Benzene was detected in samples collected from the western portion of the on-site area. Based on the distribution of COCs in soil vapor, off-site impacts were deemed likely. Figures 3 and 4 show contaminant concentrations reported for on-site area wells and on-site area vapor points, respectively.

Because the on-site area is entirely covered by asphalt and/or concrete, the site health assessment noted that contact with impacted soil and groundwater was not likely unless excavation activities occurred. On-site area groundwater is not used as a public source, and drinking water is provided from locations that are not impacted by the on-site area COCs. However, groundwater contaminated by VOCs may lead to migration into soil vapor, which could migrate in the subsurface to buildings around the on-site area.

In the BCP Significant Threat Determination Report, the proposed remedy consisted of excavation, groundwater dewatering and treatment, and a vapor intrusion evaluation, with contingent elements consisting of institutional controls and a site management plan.

2.2 Supplemental Geotechnical Investigation

A geotechnical investigation occurred at the on-site area in 2018 as part of the Brownfield redevelopment for a proposed new building. Ancora Engineering (Ancora) prepared a Supplemental Geotechnical Report dated July 6, 2018 to document their activities. Although the report does not include environmental sampling, it does provide subsurface information including geology and groundwater conditions.

Based on Ancora's report (Appendix A.2), three soil borings were advanced using mud rotary drilling methods. Two borings were advanced to 62 feet below ground surface (bgs) and the third boring was advanced to 102 feet bgs. Soil samples were collected at five foot intervals at each boring using the standard penetration method. Each sample was classified using the 2014 New York City Building Code.

The soil classifications identified three separate strata: fill, natural sand, and silty clay/silt. The fill depth ranged from 8.5 to 22 feet bgs. The natural sand was described as coarse to fine sand with varying amounts of gravel, silt, and clay with occasional boulders. This natural sand layer extended to the completion depth of the two shallow borings and to 78.5 feet in the deep boring, with the reported thickness ranging from 55 to 85 feet. The silty clay/silt layer below the natural sand layer extended to the bottom of the deep boring (102 feet). This layer was described as red, white, and gray clay with silt, and varied with brown silt and coarse to fine sand with gravel layers.

The water table was encountered at 12 to 13.5 feet bgs from June 9 through June 19, 2018.

3.0 Phase I RI Site Investigation

HDR implemented a groundwater investigation as part of the 2018 Phase I RI which included installing, developing, and sampling five new monitoring wells in the off-site area, right next to the chain-linked fence surrounding the entire on-site area. HDR did not obtain any samples from the on-site area. Soil samples were collected from the five borings for physical description when the new monitoring wells were installed. Also, soil vapor samples were collected from five newly installed soil vapor points and two sub-slab vapor points in nearby buildings. On-site data was used to locate the off-site monitoring wells and soil vapor points. Table 1 summarizes all samples collected during this investigation that were submitted for laboratory analysis. Daily field reports are included as Appendix B.

The Phase I RI field work was coordinated by HDR, as described below. Several subcontractors participated in this effort, as follows:

- AARCO Environmental Services Corp. – drilling (soil borings, monitoring wells, soil vapor points), monitoring well installation, well abandonment, investigation-derived waste management, sidewalk demolition/replacement;
- Don Stedge – surveying of new monitoring wells and soil vapor points;
- Con-test® Analytical Laboratory – laboratory analytical services of soil, groundwater and soil vapor samples;
- Data Validation Services (DVS) - data validation and preparing data usability summary reports (DUSR); and
- NAEVA Geophysics, Inc. – subsurface utility clearance.

3.1 Utility Clearance

NAEVA Geophysics, Inc. (NAEVA) under subcontract to HDR, used ground penetrating radar (GPR), electromagnetic terrain conductivity, and electrical resistivity surveys on November 20, 2018 to clear subsurface utilities at the proposed off-site drilling locations. The purpose of the surveys was to check for the potential for subsurface utilities or other underground obstructions at the proposed monitoring well and soil vapor point drilling locations. The five proposed off-site area sampling locations were checked for utility clearance.

Appendix C provides the utility clearance report prepared by NAEVA.

3.2 Subsurface Investigation

The subsurface investigation consisted of advancing soil borings, installing monitoring wells and soil vapor points, well development, and groundwater and soil vapor sample collection.

3.2.1 Soil Sampling / Drilling

3.2.1.1 Soil Borings and Well Installations

For the Phase I RI, conducted during November and December 2018, AARCO Environmental Services, Inc., of Lindenhurst, NY completed a series of soil borings, overburden wells, and soil vapor sampling points, at the off-site area. These borings, wells, and soil vapor points were installed to complete the delineation of site contaminants that have migrated off-site and downgradient, based on the network of existing on-site area wells and soil vapor points that had been installed as components of previous BCP investigations by others. Figures 5 and 6 show the off-site area soil boring/monitoring well and off-site soil vapor point locations, respectively, installed as part of the Phase I RI.

Overburden monitoring wells (2 inch diameter schedule 40 PVC) were installed at the five off-site area locations to a maximum depth of 17 feet bgs during this investigation phase. The well locations were selected to further evaluate groundwater quality and hydrogeology while also providing upgradient and downgradient coverage relative to areas of concern identified previously. AARCO called in utility mark-outs and helped with other logistics during the intrusive activities associated with the investigation.

All site work was completed in accordance with HDR's NYSDEC Standby Engineering Contract program health and safety plan (HASP) with the required site specific details provided as a supplement to the program document. Intrusive and sampling related tasks included continuous work zone air monitoring using a four gas (carbon monoxide concentration, percent lower explosive limit, percent oxygen, and hydrogen sulfide concentration) meter and photoionization detector (PID). Site work was conducted using Level D personal protective equipment (PPE).

AARCO obtained a street opening permit from the New York City Department of Transportation (NYCDOT). New York One Call was notified before drilling so that utility companies could mark-out the location of their utility lines in the off-site area. After utility clearing, the drillers hand-cleared each proposed monitoring well and soil gas monitoring location to five feet bgs using a hand auger to confirm the One Call utility mark out and the subsurface utility clearance completed by NAEVA.

AARCO used a GeoProbe® 7822DT direct push drill rig with auger and automatic drop hammer attachments to advance 4.25-inch inside diameter (ID) hollow stem augers to complete the test borings that were ultimately converted to the monitoring wells. During the drilling of the test borings, split spoon samples were collected continuously to allow an HDR geologist to field screen the subsurface soils. The samples were collected in two foot runs using a standard two foot long, two inch diameter split spoon sampler driven to the required depth by a hydraulic hammer mounted on the drill rig. The hollow stem augers used for drilling were advanced to the top of the sampling interval, after which the split spoon sampler was driven two feet ahead of the auger string into the undisturbed soil below. All field information was documented on Phase I RI boring and well construction logs which are included as Appendix D.

Upon reaching the target depth of the test boring, a standard 2 inch diameter Schedule 40 PVC monitoring well was constructed in the completed borehole. Each well was constructed using 10 foot sections of 10 slot (0.01 inch) well screen from 7 to 17 feet bgs. A filter pack of #1 Morie equivalent well sand was installed as filtration media surrounding the well screen and was brought to about two feet above the top of the screen. A well seal consisting of a roughly 2 foot thick layer of hydrated bentonite chips was placed above the filter pack to prevent short circuiting of groundwater from infiltrating directly downward through the borehole and into the screened zone and to prevent grout from entering the sand pack. Well construction details are presented in Table 2.

Cement bentonite (90%/10%) grout was placed from the top of the bentonite seal to within one foot of ground surface. Silica sand (No. 1) was placed on top of the grout from within one foot to about half a foot bgs to allow for drainage. Each well was finished with a flush mount curb box and locking vented well cap.

Five new soil vapor sampling points were installed during this Phase I investigation using the GeoProbe 7822DT direct push method to a depth of 6 feet bgs. Each new point was constructed with a 6 inch stainless steel sampling screen. A filter pack of Fil-Pro #1 Filtration Sand was placed to 1 foot above the top of the screen. Hydrated bentonite chips were inserted above the filter pack to isolate the sampling screen from short circuiting with the ambient atmosphere at the surface. The new soil vapor points were completed at the surface with a 5 inch heavy duty manhole.

A steam cleaner was used to decontaminate the drill rig, augers, and tooling after drilling each test boring was completed. The equipment was decontaminated in a pad / containment basin consisting of a repurposed fuel containment vessel.

3.2.1.2 Well Development

Each completed monitoring well was developed by AARCO using a submersible pump and an appropriate sized surge block to remove fine-grained material from the well, sand pack, and surrounding formation. Field chemistry measurements consisting of pH, temperature, conductivity, and turbidity were collected periodically and recorded on the well development logs. All well development water was containerized in 55-gallon steel drums, labelled, and transported by the investigation derived waste (IDW) subcontractor for off-site temporary storage before characterization and disposal.

3.2.1.3 Investigative Derived Waste Management

AARCO was also contracted to provide IDW containment and disposal services. At the end of each day, AARCO placed the IDW in 55-gallon DOT drums, which were secured at the off-site area. At the end of the field effort, the drums were transported to another off-site location for characterization and disposal.

3.2.2 Groundwater Sampling

The groundwater sampling program included a synoptic round of groundwater level measurements in the five new off-site area wells. The existing on-site area wells were not sampled because on-site access was not provided. Table 3 provides the groundwater elevation data collected on December 18, 2018.

A QED bladder pump with MP60 controller/compressor was used to collect the groundwater samples. A stainless steel bladder pump with HDPE tubing free of per- and polyfluoroalkyl substances (PFAS) was used to pump groundwater from each monitoring well. Groundwater was pumped to a Horiba U-52 water quality meter with a flow-through cell to measure dissolved oxygen, pH, specific conductance, turbidity, oxidation reduction potential, and temperature. The water level in each monitoring well was measured using an electronic water level meter. Groundwater samples were collected only after the field parameters had stabilized. Appendix E provided the groundwater sampling logs. The non-dedicated well sampling equipment was decontaminated between sample locations by running a detergent and water solution through the pump, followed by a tap water and a deionized water rinse.

Groundwater samples were collected from each of the five new off-site area monitoring wells and analyzed for VOCs via EPA method 8260, 1,4-dioxane via EPA method 8270 SIM, and PFAS via EPA method 537.

The following additional samples were collected as part of the groundwater quality control sampling program:

Field duplicate (FD) samples are collected at a rate of one FD for every 20 investigative samples (frequency of 5%). FDs are analyzed to check for sampling and analytical reproducibility. One FD of sample OSMW-3-20181218 was collected as part of the Phase II RI Sampling event and submitted to the analytical laboratory for analysis for VOCs via EPA method 8260, 1,4-dioxane via EPA method 8270 SIM, and PFAS via EPA method 537.

Equipment (rinsate) blank (EB) samples are collected to evaluate the potential of environmental sample contamination from inadequate decontamination of field equipment. Equipment (rinsate) blanks are collected by pouring or pumping deionized (DI) ASTM Type II water over/or through decontaminated equipment and collecting the rinsate. Equipment (rinsate) blank samples are collected at a frequency of one EB for every 20 investigative samples (frequency of 5%). Equipment (rinsate) blanks are analyzed for the same parameters as the associated environmental samples. One equipment (rinsate) blank samples was collected as part of the Phase II RI Sampling event and submitted to the laboratory for analysis for VOCs via EPA method 8260 1,4-dioxane via EPA method 8270 SIM, and PFAS via EPA method 537.

Trip blank (TB) samples are packaged with VOC samples to detect possible sample cross-contamination during handling, storage, and shipping. Trip blanks consist of preserved vials of deionized (DI) water provided by the glassware vendor (laboratory) and shipped with the glassware to HDR office. A trip blank accompanies the aqueous environmental samples through collection and shipment to the laboratory. Trip blanks are then stored by the laboratory under the same conditions as the environmental samples. A trip blank accompanied the sample cooler containing the aqueous samples collected for VOC analysis. One trip blank was submitted to the laboratory for VOC analysis via EPA method 8260.

The groundwater samples were submitted to Con-test® Analytical Laboratory in East Longmeadow, Massachusetts. Table 1 summarizes all the groundwater and associated QC samples collected during the Phase I RI sampling event.

3.2.3 Soil Vapor Sampling

On November 28 and 29, 2018, AARCO installed 5 new off-site soil vapor sampling points. The soil vapor points were installed by advancing the new soil vapor point to a finished depth of 8 feet bgs via direct push drilling method with a GeoProbe 7822DT drill rig. The soil vapor point consisted of a 6 inch stainless steel sampling screen that attached to ¼ inch outside diameter (OD) poly tubing. The screen was set in clean Fil-Pro #1 silica sand that was installed to about 7 feet bgs. Hydrated bentonite hole plug chips were added to the annulus of the boring above the screen to about 2 feet bgs to ensure the point was sealed from the ambient air. Each of the new soil vapor points was finished at the surface inside a five inch, heavy duty manhole.

On December 18, 2018, HDR collected soil vapor samples from the five newly installed soil vapor points. One sample, SG-VP3, could not be analyzed due to excessive moisture within the soil vapor point. Along with the soil vapor samples, one on-site ambient air sample and one duplicate soil vapor samples were collected. In accordance with New York State Department of Health (NYSDOH) Soil Vapor Intrusion Guidance, each new point was tested for tracer gas intrusion during the 0.2L/min purge prior to the sample collection to verify short circuiting to ambient air would not occur. All samples were collected with a laboratory batch certified 1L Summa® canister and dedicated 2 hour flow controller, and delivered via courier to Con-test® for TO-15 analysis. Sampling logs associated with soil vapor sample collection are included in Appendix F.

3.2.4 Site Survey

HDR contracted with Donald R. Stedge P.C., of Central Valley, NY to survey the five new groundwater monitoring wells and five new soil vapor points. The monitoring well survey occurred on December 18, 2018. The survey consisted of measuring the horizontal coordinates of each well and measuring the elevations of the ground surface, top of outer casing and top of inner casing. All horizontal locations were referenced to the NAD-83 controls. All elevations were referenced to the NAVD-88 controls. Vertical accuracy of the survey is 0.01 feet and horizontal accuracy is 0.1 feet.

Donald R. Stedge, P.C. provided tabulated well coordinates and elevation data and an AutoCAD™ drawing with the well locations. Table 2 provides the details of the monitoring well survey. Appendix G provides the survey data for all the surveyed features. HDR used the surveyed reference point elevations and locations to prepare a groundwater flow figure, which is discussed in more detail further below.

3.2.5 Investigation-Derived Waste Management

IDW generated during the drilling program was contained in 55-gallon steel drums and segregated according to media type (e.g., decontamination water, water produced from drilling activities and well development; drill cuttings (solids) and PPE). The drums were staged by the IDW contractor and clearly labeled with information about their contents. AARCO coordinated the waste characterization sampling and subsequent off-site disposal of the IDW drums.

4.0 Physical Characteristics

HDR went on a site visit to observe the existing site conditions, review the site history, and plan the RI implementation. HDR also obtained photographs and field notes and identified the locations of subsurface utilities and sensitive areas. All this information was used to refine subsequent work assignment tasks (e.g., identifying locations of new monitoring wells and soil vapor points; gaining sidewalk access to certain site areas; scoping field equipment needs) before starting the Phase I RI field work. Appendix B provides the daily reports of the field work including photographs of the site.

4.1 Demography and Land Use

The former Sterling Transformer site is located on the west side of Driggs Avenue within the Williamsburg section of Kings County, New York. According to city-data.com, Williamsburg has a population of 156,505 (http://www.city-data.com/neighborhood/Williamsburg-Brooklyn-NY.html).

The site is in an urban area, and is mostly covered with buildings, concrete sidewalks, and asphalt streets. Historic aerial photographs of the on-site area show the presence of a building which was torn down before 2008. Currently the on-site area is bounded to the north by a tea bar and a toy store (Matt & Juliette); to the east by Driggs Avenue, with a grocery store/apartment building beyond; to the west by residences; and to the south by a North 8th Street, with a residential apartment complex and ground floor professional offices.

The area around the on-site area is serviced by the New York City Department of Environmental Protection (NYCDEP) public water system and a municipal sewer system. These utilities could serve as conduits for water or vapor migration.

Most of the on-site area surface is currently an undeveloped/vacant parking lot, although foundations of the building torn down before 2008 may remain below the surface. The area around the site is mostly covered by buildings or by concrete (sidewalks) and asphalt (roads), which limit infiltration. Stormwater (i.e., runoff from building roofs and paved areas) is handled by existing drains and infrastructure (and surface hydrology) that direct all surplus water to the New York City combined sewer system. Therefore, infiltration is limited to unfinished areas such as landscaping.

4.2 Geology

The upper layer of substrate beneath the on-site area impervious surface layer consists of reworked material, including urban fill.

The site is in the Atlantic Coastal Plain physiographic province and is comprised of interbedded layers of sand, clay and marl. Marine deposits date from the Cretaceous and Quaternary. Drift deposits are derived from glacial activity that occurred during the Pleistocene Epoch. Total thickness of the marine and glacial deposits in Kings County ranges from 0 foot in northwestern Queens to 1,100 feet thick in southeastern Brooklyn (Perlmutter and Arnow, 1953). Based on top of bedrock elevations (Baskerville, 1990), the depth of unconsolidated deposits exceeds 100 feet for the Williamsburg section of Brooklyn.

The topography of the area slopes to the west toward the East River. Ground surface elevations of the borings next to the site are between 15 to 21 feet above mean sea level (msl). The ground surface next to the site consists of poured concrete and asphalt pavement. Shallow sediments beneath the fill at the site consist of a brown, medium to coarse grained sand with some silt and trace gravel. In general, the subsurface beneath the area consists of interbedded layers of sand, gravel, and clay and silt mixture down to about 75 feet bgs. Bedrock beneath the site is encountered at depths over 100 feet bgs. The regional direction of groundwater flow beneath the site is to the west, toward the East River.

Based on the soil descriptions presented in the geotechnical boring logs for the on-site area, the fill layer ranged from 8 to 22 feet thick. It was described as loose to very dense coarse to fine sand with varying amounts of silt, gravel, concrete and brick fragments. Around the on-site area, the fill appears to range from 12 to 17 feet bgs, based on the five borings advanced in November 2018. Beneath the fill is a medium to coarse sand with gravel and silt. Geotechnical borings on the on-site area site show that this layer extends to 78.5 feet and is estimated to be between 55 and 85 feet thick (Ancora, 2018). A gray clay or silt was encountered in the deepest geotechnical boring but bedrock was not encountered at 102 feet bgs in this boring (Ancora, 2018).

Based on water level measurements collected during the water sampling activity, groundwater is about 9 to 12 feet bgs in the vicinity of the site. Saturated soils were encountered above the water table in some areas in the site, suggesting that a perched layer may exist. For example, wet soils where encountered at OSMW-3, as shallow as 4 feet bgs. However, the depth to water before the start of the groundwater sampling activities was 8.89 feet bgs.

Based on the Geologic Map of New York (1970, reprinted 1995), the site vicinity is identified as glacial and alluvial deposits with unknown underlying bedrock geology. Based on Baskerville (1988), the bedrock geology beneath Brooklyn consists of the Hartland Formation of Middle Ordovician to Late Cambrian Age. The Hartland Formation consists of interbedded muscovite-biotite-quartz schist, quartz-biotite-hornblende amphibolite, and gneissic-quartz-microcline-muscovite-biotite-plagioclase granite. Bedrock outcrops at a few locations along the northwest edge of Kings and Queens Counties and slopes at about 80 feet per mile to the southeast (Holzmacher, McLendon & Murrell, P.C., 1982).

4.3 Soils

The United States Department of Agriculture (USDA) National Cooperative Soil Survey interactive Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx) characterizes the site soils as UtB – Urban land-till substratum (3 to 8 percent slopes), and low impervious surface. The UtB unit's typical profile is cemented material from 0 to 15 inches and gravelly sandy loam from 15 to 79 inches bgs with a very low capacity of its most limiting layer to transmit water.

The New York City Soil Reconnaissance Survey (2005) shows that surficial soils consist of pavement and buildings overlying till (0 to 5% slopes). Till is described as nearly level to gently sloping and generally within urban centers as over 80% of the surface is covered by impervious pavement and buildings.

4.4 Hydrogeology

Unconsolidated deposits were the primary source of water supply in Brooklyn, where present. These deposits consist mainly of till from a ground moraine, terminal moraine or glacial outwash deposits. Ground moraine deposits exist in the vicinity of the on-site area.

Installation of supply wells and groundwater pumpage in Brooklyn increased with time due to historic public and industrial demand for groundwater. Also, stormwater sewers installed in the borough together with an increase of paved and concreted areas, limited the groundwater recharge potential. Over time, the aquifer became stressed due to overpumpage and reduced recharge which resulted in severe drops in the water table elevation. The Williamsburg section of Brooklyn reportedly had the deepest cone of depression at 35 feet below sea level (Permutter & Soren, 1962). Saltwater intrusion increased in response to the drop in water table elevation in the early to mid-1900s, resulting in high chloride concentrations in the groundwater making it unsuitable for potable use. In 1947, these factors led to a halt in groundwater pumping in Brooklyn and it is no longer used for public supply at this time.

5.0 Phase I Remedial Investigation Findings

5.1 Applicable Standards, Criteria and Guidance

The Phase I RI used applicable standards, criteria and guidance (SCGs) to evaluate the analytical data for groundwater and soil vapor and to determine the nature and extent of contamination at the off-site area. The SCGs are included in the analytical data tables of the RI report along with any qualifiers from DVS based on the data validation. All Phase I RI analytical data reports are included in Appendix H, and data validation reports are included in Appendix I.

5.1.1 Groundwater

Groundwater analytical results were compared to NYSDEC GWQS 6 NYCRR Part 703 (NYSDEC 1999). The groundwater values from the Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS 1.1.1) were used as screening criteria for compounds lacking GWQS.

5.1.2 Soil Vapor

NYSDEC does not currently have any SCGs for subsurface soil vapor. NYSDOH developed decision matrices to provide guidance on a case by case basis to evaluate soil vapor results from buildings with full slab basements. Although some soil vapor samples collected during this investigation did not come from beneath buildings, the soil vapor results were compared with the decision matrices for discussion purposes.

5.2 Groundwater Sample Results

Groundwater samples were collected from each of the five newly installed monitoring wells. Table 4 provides the analytical results from these wells. Figure 7 shows these data plotted on the site base map. The complete laboratory analytical data package is included as a component of Appendix H.

TCE was detected in groundwater samples collected from three of the five monitoring wells. The TCE concentrations in those three samples exceeded the TOGS GWQS of 5 micrograms per liter (ug/l), with the highest concentration (63 ug/l) detected in the OSMW-2 sample. This well is located at the southeastern portion of the on-site area, just north of the Driggs Avenue/North 8th Street intersection.

The TCE degradation compounds cis-1,2-dichloroethene (c-1,2-DCE), trans-1,2-dichloroethene (t-1,2-DCE) and vinyl chloride were detected in wells OSMW-2 and OSMW-3. C-1,2-DCE and t-1,2-DCE were detected in OSWM-2 (at 230 ug/l and 2.6 ug/l, respectively) and in OSMW-3 (at 20 ug/l and 0.37 ug/l, respectively). Vinyl chloride was detected in OSMW-2 at 7 ug/l and in OSMW-

3 at 0.43 ug/l. The concentrations of c-1,2-DCE and vinyl chloride in the OSMW-2 sample were above their GWQS.

Benzene was the only other VOC present above its GWQS of 1 ug/l. It was detected in one sample (OSMW-2) at 1.8 ug/l. Other VOCs detected in groundwater samples but below their GWQS included acetone, methyl tert-butyl ether (MTBE) each in one sample, and toluene in two samples (OSMW-1 and OSMW-5).

The newly installed wells were also sampled for PFAS and 1,4-dioxane. Results of the sample analyses showed perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in each of the five samples. The highest combined concentration (179 nanograms per liter or ng/l) was detected in the sample collected from OSMW-2. The PFOA concentrations exceeded the EPA health advisory of 70 parts per trillion (ppt) in four of the five samples, with the concentration in the OSMW-3 sample (20 ppt) being the exception. All samples exceeded the proposed PFOS criteria of 10 ng/l. Each of the five groundwater samples contained detectable concentrations of 1,4-dioxane. Only one sample was reported to have a 1,4-dioxane concentration above the EPA Health Advisory of 0.35 ug/l. That sample, collected from OSMW-4, contained 0.44 ug/l of 1,4-dioxane.

5.3 Soil Vapor Sample Results

All soil vapor samples were collected following the procedures described in the NYSDOH Soil Vapor Intrusion guidance document. No New York State standards or guidance values are published for soil vapor constituents. However, for discussion purposes, the detected concentrations were compared to the decision matrix concentration ranges presented in the NYSDOH Soil Vapor Intrusion guidance, with updates noted on the NYSDEC web page.

Table 5 and Figure 8 presented the analytical results of the soil vapor samples collected in December 2018. Appendix H includes the laboratory reports of the soil vapor samples. Table 6 and Figure 9 present the sub-slab sample and ambient air results for samples collected in December 2019.

TCE was detected above Soil Vapor/Indoor Air Matrix A guidance of 6 ug/m^3 in one of the four sub-slab samples. It was detected at 10,000 ug/m^3 in the SG-VP1 sample, at the north side of North 8th Street, which correlates to the western extent of the former Sterling Transformer site. TCE was detected in two other samples, SG-VP2 and SG-VP-4, at 1.8 and 2.8 ug/m^3, respectively. It was not detected in the SG-VP5 sample. In comparison, the highest TCE concentration (16,900 ug/m^3 at 14SG2) detected in the prior on-site results was also along North 8th Street but near the southern extent of the former Sterling Transformer site.

Tetrachloroethene (PCE) was detected above the Soil Vapor/Indoor Air Matrix B guidance of 100 ug/m^3 in one of the four samples. At SG-VP5, the reported concentration is 240 ug/m^3. SG-VP5 is at the south side of North 9th Street, west of Driggs Avenue and correlates to the northern extent of the former Sterling Transformer site. PCE was also detected in the SG-VP-1 and SG-VP-4 samples at 29 ug/m^3 and 3.1 ug/m^3, respectively. Both concentrations are below the guidance of 100 ug/m^3. PCE was not detected in the SG-VP2 sample.

Concentrations of the remaining compounds identified in NYSDOH's Soil Vapor/Indoor Air Matrices are below the guidance values.

Results of a sub-slab sample collected from a nearby property (197 North 8th Street) show a TCE concentration of 40 ug/m^3. However, the TCE concentration in the associated ambient air sample is below detection limits (<0.076 ug/m^3). Results of the sub-slab sample collected at the second property (505 Driggs) are below the most stringent decision matrix criteria.

Carbon tetrachloride concentrations in ambient air samples collected from both properties are above 0.2 mg/m^3. However, the concentrations in the associated sub-slab samples are below 6 ug/m^3. At 197 North 8th Street, the sub-slab concentration of carbon tetrachloride was 0.26 mg/m^3. Carbon tetrachloride was not detected in the sub-slab sample (or its duplicate) for the 505 Driggs property.

Methylene chloride was detected in the ambient air sample at 110 ug/m^3 in the 505 Driggs sample. The associated sub-slab vapor sample was 0.85 ug/m^3, which is three orders of magnitude below the 100 ug/m^3 guidance concentration. Therefore, the concentrations fall within the no further action box of the decision matrix.

5.4 Groundwater Flow

The depth to groundwater measurements collected on December 18, 2018 before groundwater sampling show that groundwater appears to flow from north to south within the investigation area. Figure 10 presents the groundwater elevations. These data were not contoured due to the apparent flat groundwater flow. The flow direction from the September 2014 on-site investigation which showed groundwater flowing to the northeast. This difference likely reflects the relatively flat groundwater table that may be accentuated by minor variations in individual wells during a groundwater monitoring event. The overall groundwater flow direction is expected to be to the west, toward the East River.

6.0 Conclusions and Recommendations

6.1 Results Summary and Data Interpretation

The analytical results of the groundwater samples collected from the five new off-site area wells show VOC concentrations above the GWQS in three of the five wells. The highest concentrations were detected in the OSMW-2 groundwater sample, where cis-1,2-DCE (230 ug/l), TCE 63 ug/l), vinyl chloride (7 ug/l) and benzene (1.8 ug/l) were detected. TCE (6.6 ug/l) and cis-1,2-DCE (20 ug/l) were also detected above the GWQS in OSMW-3 whereas TCE was detected above the GWQS in OSMW-1 (31 ug/l). No VOCs were detected at concentrations above the GWQS in OSMW-4 or OSMW-5.

Comparing the VOC distribution in groundwater from the earlier on-site area investigations to the current off-site area investigation shows the highest concentrations of chlorinated VOCs toward the southeast corner of the on-site area near the intersection of Driggs Avenue and North 8th Street. Benzene, toluene, ethylbenzene and xylene do not appear to have migrated off-site because the highest concentrations detected in the off-site area wells are three orders of magnitude lower than the highest detections in on-site area wells. The flat groundwater flow gradient may limit off-site migration of VOCs.

The sum of the PFOA and PFOS concentrations measured in the five off-site area wells range from 78.6 ng/l in the sample collected at OSMW-4 to 179 ng/l in the sample collected at OSMW-2. It is not possible to compare the off-site area to the on-site area PFAS data because PFAS were not sampled during the 2014 on-site area site investigation.

The concentration of 1,4-dioxane in the groundwater sample collected from off-site area well OSMW-4 is 0.44 ug/l. The compound was not detected in the four other off-site area wells. It is not possible to compare the off-site area to the on-site area 1,4-dioxane data because this compound was not sampled during the 2014 site investigation.

Using the concentration ranges found in the decision matrices for sub-slab and ambient air samples additional vapor intrusion investigations are not warranted at this time. However, the TCE concentration (10,000 ug/m^3) reported for a soil vapor sample collected near the western extent of the former Sterling Transformer site should warrant additional vapor intrusion investigations near this sample.

6.2 Data Gaps and Additional Investigation Needs

Based on the interpretation of the Phase I RI findings presented in this report, certain data gaps exist which prevent a complete understanding of contaminant distribution at the off-site area and further out. Additional phase(s) of sampling at the off-site area may be considered for further delineation based on the presence of VOCs in the on-site area following the proposed on-site remedy, which is removal of all on-site soils which exceed the Unrestricted Use Soil Cleanup

Objectives Soils at the site have been impacted by pesticides, metals, solvents, and semi-volatile organic compounds along with dewatering considering the excavation will extend below the groundwater table. The proposed excavation will be to 25 feet with over-excavation to greater depths if needed. These considerations are described below.

- Phase II RI activities may be scoped to further investigate and delineate off-site groundwater conditions and specific areas of interest at the on-site area. Wells were drilled in the sidewalk next to the site boundary during the Phase I RI. Wells on the opposite sides of Driggs Avenue, North 8th Street and North 9th Street may be considered to confirm delineation of groundwater contaminants to concentrations below the GWQS. More monitoring wells to the east and south away from the site boundary will be needed if the contaminant plume needs to be delineated to the GWQS.
- Additional soil vapor points may also be planned as part of a Phase II RI, based on the Phase I RI results. During Phase I, five new soil vapor points were installed, each within the sidewalk next to the site boundary. A sample collected from one of the new soil vapor points (SG-1) had 10,000 ug/m^3 of TCE. This location is south of the on-site area, along North 8th Street. Further delineation of the TCE in soil vapor at the southern extent of the off-site area should be considered.
- Given the concentrations of VOCs detected in groundwater and soil vapor at the five off-site area locations, an assessment of potential soil vapor intrusion in nearby buildings, especially in the residential building (183 North 8th Street) to the west of the on-site area should be considered.
- A second round of groundwater sampling is recommended at the off-site area to confirm the Phase I results of the newly installed monitoring wells and to assess the effectiveness of the remedy at the on-site area. A second groundwater sample round will provide additional information to:
    - Evaluate site-wide VOC concentrations and distribution with a comparison of recent on-site area and off-site area data.
    - Further assess the area near the Driggs Avenue/North 8th Street intersection where chlorinated VOCs have been detected at concentrations two orders of magnitude above the GWQS.
    - Re-inspect conditions of the five off-site area monitoring wells and soil vapor points following implementation of the on-site remedy and site development to assess potential damage associated with those activities. Any damaged well or soil vapor point should be considered for repair, installing a new well, and/or abandoning the existing well in-place .

6.3 Potential Interim Remedial Measures and Technology Screening

IRMs may be applicable for off-site areas where soil vapor intrusion is suspected (i.e., the buildings next to the on-site area where high VOC concentrations and odors were noted). An IRM Screening Memorandum for the off-site area may be developed with input from NYSDEC. If pursued, the memorandum should describe the area (e.g., location, physical characteristics, nature and extent of contamination) and identify potential options for addressing, monitoring, and managing the contamination. The IRMs could be implemented, if applicable, after completing the IRM screening and evaluation.

If pursued by NYSDEC, a focused technology screening report for other components, such as areas of groundwater contamination, may be developed in accordance with procedures from NYSDEC DER-10, NCP 300.430(e), and other guidance. The focused report may contain the following items, based on findings from the RI:

- Objectives of the focused technology screening report;
- Remedial action objectives;
- General response actions and IRM recommendations;
- Identifying and screening of remedial technologies; and
- Summary, conclusions, and recommendations for a feasibility study (FS).

An assessment of monitored natural attenuation (MNA) may be recommended to address groundwater contamination. Results of the MNA evaluation could be included in the IRM screening and technology screening reports.

7.0 Certification

I, *Erich Zimmerman*, certify that I am currently a NYS registered professional engineer and that this *Phase I Remedial Investigation Report* was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

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Erich Zimmerman, P. E.
Contract Manager

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Tables

Table 1
Remedial Investigation Sample Summary
Former Sterling Transformer Corp. Off-Site
510 Driggs Ave., Brooklyn, NY

Water

Location	Sample ID	Laboratory ID	Source	Type	Date Collected	VOCs 8260	1,4-Dioxane 8270 SIM	PFAS 537M
OSMW-1	OSMW-1-20181218	18L0940-02	Monitoring Well	Groundwater	12/18/2018	X	X	X
OSMW-2	OSMW-2-20181218	18L0940-01	Monitoring Well	Groundwater	12/18/2018	X	X	X
OSMW-3	OSMW-3-20181218	18L0940-03	Monitoring Well	Groundwater	12/18/2018	X	X	X
OSMW-3	OSMW-3-20181218-1	18L0940-04	Monitoring Well	QAQC - Duplicate	12/18/2018	X	X	X
OSMW-4	OSMW-4-20181218	18L0940-06	Monitoring Well	Groundwater	12/18/2018	X	X	X
OSMW-5	OSMW-5-20181218	18L0940-07	Monitoring Well	Groundwater	12/18/2018	X	X	X
EB-20181218	EB-20181218	18L0940-05	Equipment Blank	QAQC	12/18/2018	X	X	X
TB-20181218	TB-20181218	18L0940-08	Trip Blank	QAQC	12/18/2018	X		

Air

Location	Sample ID	Laboratory ID	Source	Type	Date Collected	VOCs TO15
SG-VP-1	SG-VP1-20181218	18L0963-02	Vapor Point	Soil Vapor	12/18/2018	X
SG-VP-2	SG-VP2-20181218	18L0963-01	Vapor Point	Soil Vapor	12/18/2018	X
SG-VP-4	SG-VP4-20181218	18L0963-04	Vapor Point	Soil Vapor	12/18/2018	X
SG-VP-4	SG-VP4-20181218-1	18L0963-05	Vapor Point	QAQC - Duplicate	12/18/2018	X
SG-VP-5	SG-VP5-20181218	18L0963-06	Vapor Point	Soil Vapor	12/18/2018	X
505 Driggs	SS-505DRIGGS-20191209-0	19L0597-01	Vapor Point	Sub Slab	12/9/2019	X
505 Driggs	SS-505DRIGGS-20191209-1	19L0597-02	Vapor Point	Sub Slab	12/9/2019	X
505 Driggs	AA-505DRIGGS-20191209-0	19L0597-03	Indoor Air	Ambient Air	12/9/2019	X
197 North 8th	SS-197N8TH-20191212	19L0597-04	Vapor Point	Sub Slab	12/9/2019	X
197 North 8th	AA-197N8TH-20191212	19L0597-05	Indoor Air	Ambient Air	12/9/2019	X

QA/QC sample frequency as follows
Equipment Blank - 1 per 20 decontamination events for each type of sampling equipment
Trip Blank - 1 sample per cooler
Field Duplicates - 1 per 20 sample media
A soil vapor sample was attempted from SG-VP-3 on 12/18/18, but could not be collected due to high moisture content

Table 2
Monitoring Well and Soil Vapor Point Construction Details
Former Sterling Transformer Corp. Off-Site
510 Driggs Ave., Brooklyn, NY

Monitoring Wells

Location	Northing	Easting	Ground Elevation	Top of Well Elevation	Well Diameter (in)	Total Depth (ft bgs)	Screen Interval (ft bgs)
OSMW-1	686868.28	642886.84	21.03	20.66	2	17.5	7-17
OSMW-2	686861.66	642986.93	17.60	17.27	2	16.3	7-17
OSMW-3	686940.30	643062.25	15.46	15.20	2	17.3	7-17
OSMW-4	686999.70	643066.67	15.26	14.97	2	17.71	7-17
OSMW-5	687028.04	643031.73	16.28	16.07	2	17.16	7-17

All monitoring wells were constructed of 10-slot (0.010 inch) Schedule 40 PVC and finished with a flush mount protective casing.
Well backfill consisted of a #1 sand from the bottom of the boring to 2 feet above the top of the screen with a 2 foot thick bentonite seal above the sand pack.
ft bgs - feet below ground surface

Soil Vapor Points

Location	Northing	Easting	Ground Elevation
SG-1	686865.69	642887.71	20.93
SG-2	686862.70	642987.58	17.54
SG-3	686941.64	643063.24	15.41
SG-4	687000.68	643065.09	15.31
SG-5	687029.03	643030.28	16.26

All survey data is based on NAD 83 New York East Zone

Table 3
Groundwater Elevations
Former Sterling Transformer Corp. Off-Site
510 Driggs Ave., Brooklyn, NY

Location	Ground Elevation	Top of Well Elevation	Depth to Water (ft below TOC)	Groundwater Elevation (ft)	Screen Interval (ft bgs)
OSMW-1	21.03	20.66	14.25	6.41	7-17
OSMW-2	17.60	17.27	11.61	5.66	7-17
OSMW-3	15.46	15.20	8.89	6.31	7-17
OSMW-4	15.26	14.97	8.59	6.38	7-17
OSMW-5	16.28	16.07	9.66	6.41	7-17

Depth to Water measurements were collected on 12/18/2018

Table 4
Groundwater Sample Results
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

			Sample:	OSMW-1-20181218		OSMW-2-20181218		OSMW-3-20181218		OSMW-3-20181218-1		OSM3-4-20181218		OSMW-5-20181218	
			Location:	OSMW-1		OSMW-2		OSMW-3		OSMW-3 DUP		OSMW-4		OSMW-5	
			Sample Date:	12/18/2018		12/18/2018		12/18/2018		12/18/2018		12/18/2018		12/18/2018	
			Start Depth (ft):	7		7		7		7		7		7	
			End Depth (ft):	17		17		17		17		17		17	
Analyte	**CAS Number**	**NYS 703.5 TOGS Class GA Criteria**	**Units**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	630-20-6	5	ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
1,1,1-Trichloroethane	71-55-6	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
1,1,2,2-Tetrachloroethane	79-34-5	5	ug/l	0.16	U	0.32	U	0.16	U	0.16	U	0.16	U	0.16	U
1,1,2-Trichloroethane	79-00-5	1	ug/l	0.24	U	0.47	U	0.24	U	0.24	U	0.24	U	0.24	U
1,1-Dichloroethane	75-34-3	5	ug/l	0.16	U	0.32	U	0.16	U	0.16	U	0.16	U	0.16	U
1,1-Dichloroethene	75-35-4	5	ug/l	0.21	U	1.3	JD	0.21	U	0.21	J	0.21	U	0.21	U
1,1-Dichloropropene	563-58-6		ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
1,2,3-Trichlorobenzene	87-61-6	5	ug/l	0.14	U	0.28	U	0.14	U	0.14	U	0.14	U	0.14	U
1,2,3-Trichloropropane	96-18-4	0.04	ug/l	0.22	U	0.43	U	0.22	U	0.22	U	0.22	U	0.22	U
1,2,4-Trichlorobenzene	120-82-1	5	ug/l	0.19	U	0.38	U	0.19	U	0.19	U	0.19	U	0.19	U
1,2,4-Trimethylbenzene	95-63-6	5	ug/l	0.18	U	0.36	U	0.18	U	0.18	U	0.18	U	0.18	U
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.04	ug/l	0.37	U	0.74	U	0.37	U	0.37	U	0.37	U	0.37	U
1,2-Dibromoethane (Ethylene dibromide)	106-93-4	0.0006	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
1,2-Dichlorobenzene	95-50-1	3	ug/l	0.17	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U
1,2-Dichloroethane	107-06-2	0.6	ug/l	0.19	U	0.39	U	0.19	U	0.19	U	0.19	U	0.19	U
1,2-Dichloropropane	78-87-5	1	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
1,3,5-Trichlorobenzene	108-70-3	5	ug/l	0.17	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
1,3-Dichlorobenzene	541-73-1	3	ug/l	0.17	U	0.34	U	0.17	U	0.17	U	0.17	U	0.17	U
1,3-Dichloropropane	142-28-9	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
1,4-Dichlorobenzene	106-46-7	3	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
1,4-Dioxane	123-91-1		ug/l	26	U	53	U	26	U	26	U	26	U	26	U
2,2-Dichloropropane	594-20-7	5	ug/l	0.21	U	0.43	U	0.21	U	0.21	U	0.21	U	0.21	U
2-Butanone	78-93-3	50	ug/l	2.4	U	4.7	U	2.4	U	2.4	U	2.4	U	2.4	U
2-Chlorotoluene	95-49-8	5	ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
2-Hexanone	591-78-6	50	ug/l	1.5	U	3	U	1.5	U	1.5	U	1.5	U	1.5	U
4-Chlorotoluene	106-43-4	5	ug/l	0.14	U	0.28	U	0.14	U	0.14	U	0.14	U	0.14	U
4-Methyl-2-Pentanone	108-10-1		ug/l	1.5	U	2.9	U	1.5	U	1.5	U	1.5	U	1.5	U
Acetone	67-64-1	50	ug/l	15	J	19	U	9.7	U	9.7	U	9.7	U	9.7	U
Acrylonitrile	107-13-1	5	ug/l	0.58	U	1.2	U	0.58	U	0.58	U	0.58	U	0.58	U
Benzene	71-43-2	1	ug/l	0.15	J	1.8	JD	0.23	J	0.12	U	0.12	U	0.12	U
Bromobenzene	108-86-1	5	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
Bromochloromethane	74-97-5	5	ug/l	0.22	U	0.45	U	0.22	U	0.22	U	0.22	U	0.22	U
Bromodichloromethane	75-27-4	50	ug/l	0.3	U	0.59	U	0.3	U	0.3	U	0.3	U	0.3	U
Bromoform	75-25-2	50	ug/l	0.21	U	0.42	U	0.21	U	0.21	U	0.21	U	0.21	U
Bromomethane	74-83-9	5	ug/l	0.94	U	1.9	U	0.94	U	0.94	U	0.94	U	0.94	U
Butane, 2-Methoxy-2-Methyl	994-05-8		ug/l	0.11	U	0.21	U	0.11	U	0.11	U	0.11	U	0.11	U
Carbon Disulfide	75-15-0	60	ug/l	1	U	2	U	1	U	1	U	1	U	1	U
Carbon Tetrachloride	56-23-5	5	ug/l	0.25	U	0.49	U	0.25	U	0.25	U	0.25	U	0.25	U
Chlorobenzene	108-90-7	5	ug/l	0.16	U	0.32	U	0.16	U	0.16	U	0.16	U	0.16	U
Chlorodibromomethane	124-48-1	50	ug/l	0.1	U	0.21	U	0.1	U	0.1	U	0.1	U	0.1	U
Chloroethane	75-00-3	5	ug/l	0.28	U	0.56	U	0.28	U	0.28	U	0.28	U	0.28	U
Chloroform	67-66-3	7	ug/l	0.22	U	0.44	U	0.22	U	0.22	U	0.22	U	0.22	U
Chloromethane	74-87-3	5	ug/l	0.55	U	1.1	U	0.55	U	0.55	U	0.55	U	0.55	U
Cis-1,2-Dichloroethene	156-59-2	5	ug/l	0.72	J	230	D	20		20		0.15	U	0.35	J
Cis-1,3-Dichloropropene	10061-01-5		ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
Cymene	99-87-6	5	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
Dibromomethane	74-95-3	5	ug/l	0.16	U	0.32	U	0.16	U	0.16	U	0.16	U	0.16	U
Dichlorodifluoromethane	75-71-8	5	ug/l	0.28	U	0.57	U	0.28	U	0.28	U	0.28	U	0.28	U
Dichloromethane	75-09-2	5	ug/l	3.2	U	6.4	U	3.2	U	3.2	U	3.2	U	3.2	U
Diethyl Ether (Ethyl Ether)	60-29-7		ug/l	0.22	U	0.44	U	0.22	U	0.22	U	0.22	U	0.22	U

Table 4
Groundwater Sample Results
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

			Sample:	OSMW-1-20181218		OSMW-2-20181218		OSMW-3-20181218		OSMW-3-20181218-1		OSM3-4-20181218		OSMW-5-20181218	
			Location:	OSMW-1		OSMW-2		OSMW-3		OSMW-3 DUP		OSMW-4		OSMW-5	
			Sample Date:	12/18/2018		12/18/2018		12/18/2018		12/18/2018		12/18/2018		12/18/2018	
			Start Depth (ft):	7		7		7		7		7		7	
			End Depth (ft):	17		17		17		17		17		17	
Analyte	CAS Number	NYS 703.5 TOGS Class GA Criteria	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Ethyl Tert-Butyl Ether	637-92-3		ug/l	0.095	U	0.19	U	0.095	U	0.095	U	0.095	U	0.095	U
Ethylbenzene	100-41-4	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
Freon 113	76-13-1	5	ug/l	0.2	U	0.39	U	0.2	U	0.2	U	0.2	U	0.2	U
Hexachlorobutadiene	87-68-3	0.5	ug/l	0.59	U	1.2	U	0.59	U	0.59	U	0.59	U	0.59	U
Isopropyl benzene	98-82-8	5	ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
Isopropyl Ether	108-20-3		ug/l	0.18	U	0.36	U	0.18	U	0.18	U	0.18	U	0.18	U
m,p-Xylene	179601-23-1		ug/l	0.26	U	0.51	U	0.26	U	0.26	U	0.26	U	0.26	U
Methyl acetate	79-20-9		ug/l	0.42	U	0.84	U	0.42	U	0.42	U	0.42	U	0.42	U
Methyl T-Butyl Ether (MTBE)	1634-04-4	10	ug/l	0.09	U	0.18	U	0.09	U	0.09	U	2.4		0.09	U
Methylcyclohexane	108-87-2		ug/l	0.63	U	1.3	U	0.63	U	0.63	U	0.63	U	0.63	U
Naphthalene	91-20-3	10	ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
N-Butylbenzene	104-51-8	5	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
N-PROPYLBENZENE	103-65-1	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
O-Xylene	95-47-6	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
SEC-Butylbenzene	135-98-8	5	ug/l	0.13	U	0.26	U	0.13	U	0.13	U	0.13	U	0.13	U
Styrene	100-42-5	5	ug/l	0.15	U	0.3	U	0.15	U	0.15	U	0.15	U	0.15	U
T-Butylbenzene	98-06-6	5	ug/l	0.12	U	0.24	U	0.12	U	0.12	U	0.12	U	0.12	U
Tert-Butyl Alcohol	75-65-0		ug/l	2.2	U	4.3	U	2.2	U	2.2	U	2.2	U	2.2	U
Tetrachloroethene	127-18-4	5	ug/l	0.27	U	0.54	U	0.27	U	0.27	U	0.27	U	0.27	U
Tetrahydrofuran	109-99-9	50	ug/l	1.1	U	2.1	U	1.1	U	1.1	U	1.1	U	1.1	U
Toluene	108-88-3	5	ug/l	0.17	J	0.34	U	0.17	U	0.17	U	0.17	U	0.17	J
Trans-1,2-Dichloroethene	156-60-5	5	ug/l	0.15	U	2.6	D	0.37	J	0.36	J	0.15	U	0.15	U
Trans-1,3-Dichloropropene	10061-02-6		ug/l	0.11	U	0.22	U	0.11	U	0.11	U	0.11	U	0.11	U
Trans-1,4-Dichloro-2-Butene	110-57-6	5	ug/l	0.31	U	0.62	U	0.31	U	0.31	U	0.31	U	0.31	U
Trichloroethylene	79-01-6	5	ug/l	31		63	D	6.6		6.2		0.2	U	0.26	J
Trichlorofluoromethane	75-69-4	5	ug/l	0.15	U	0.29	U	0.15	U	0.15	U	0.15	U	0.15	U
Vinyl Chloride	75-01-4	2	ug/l	0.13	U	7	D	0.43	J	0.13	U	0.13	U	0.13	U
Semi-Volatile Organic Compounds															
1,4-Dioxane	123-91-1	0.35	ug/l	0.22	J	0.14	J	0.17	J	0.11	J	0.44		0.1	J
Perfluorocarbons															
2-(N-methyl perfluorooctanesulfonamido) acetic acid	2355-31-9		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	2991-50-6		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluorobutanesulfonic Acid	375-73-5		ng/l	15		24		28		91		3.3		29	
Perfluorobutyric Acid (PFBA)	375-22-4		ng/l	3.8		6.4		12		42		5.8		9.2	
Perfluorodecane Sulfonic Acid	335-77-3		ng/l	2.3		2	U	2	U	2	U	2	U	2	U
Perfluorodecanoic Acid (PFDA)	335-76-2		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluorododecanoic Acid (PFDoA)	307-55-1		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluoroheptane Sulfonate (PFHpS)	375-92-8		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluoroheptanoic Acid (PFHpA)	375-85-9		ng/l	8.2		18		20		2	U	18		24	
Perfluorohexanesulfonic Acid	355-46-4		ng/l	16		12		9.1		2	U	7.3		22	
Perfluorohexanoic Acid (PFHxA)	307-24-4		ng/l	12		21		44		15		18		31	
Perfluorononanoic Acid	375-95-1		ng/l	2	U	6.4		3.7		2	U	2	U	4.9	
Perfluorooctane Sulfonamide (FOSA)	754-91-6		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluoropentanoic Acid (PFPeA)	2706-90-3		ng/l	19		18		55		2	U	14		23	
Perfluorotetradecanoic Acid (PFTeA)	376-06-7		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluorotridcanoic Acid (PFTriA)	72629-94-8		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Perfluoroundecanoic Acid (PFUnA)	2058-94-8		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonate (6:2)	M2-8:2FTS		ng/l	2	U	2	U	2	U	2	U	2	U	2	U
Sodium 1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonate (6:2)	M2-6:2FTS		ng/l	2	U	2.1		2	U	5.5		2	U	2	U
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1		ng/l	11		29		24		15		5.6		26	
Perfluorooctanoic acid (PFOA)	335-67-1		ng/l	75		150		99		20		73		79	
Sum of PFOA and PFOS		10	ng/l	86		179		123		35		78.6		105	

Table 4
Groundwater Sample Results Notes
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

Qualifiers	Definitions
D	Indicates the result was run as a dilution.
J	Indicates an estimated value.
U	Indicates result was not detected. Reporting detection limit is listed instead.

Criteria	Applicable Criteria	Defintions
Groundwater	NYS Ground Water Class GA	New York State Part 703.5 Criteria, Type H(WS), Class GA

Notes:

New York State Part 703.5 Water quality standards for taste-, color- and odor-producing, toxic and other deleterious substances

https://govt.westlaw.com/nycrr/Document/I4ed90418cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

Table 5
Soil Gas Results
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

					Sample:	SG-VP1-20181218		SG-VP2-20181218		SG-VP4-20181218		SG-VP4-20181218-1		SG-VP5-20181218	
					Location:	SG-1		SG-2		SG-4		SG-4 DUP		SG-5	
					Sample Date:	12/18/2018		12/18/2018		12/18/2018		12/18/2018		12/18/2018	
Analyte	CAS Number	NYSDOH Soil Vapor/Indoor Air Decision Sub-Slab Vapor Concentration			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Volatile Organic Compounds															
1,1,1-Trichloroethane	71-55-6	<100	100 to <1000	1000 and above	ug/m3	17	D	0.2	U	0.41	U	0.41	U	0.41	U
1,1,2,2-Tetrachloroethane	79-34-5				ug/m3	6.1	U	0.3	U	0.61	U	0.61	U	0.61	U
1,1,2-Trichloroethane	79-00-5				ug/m3	4.5	U	0.22	U	0.45	U	0.45	U	0.45	U
1,1-Dichloroethane	75-34-3				ug/m3	2.5	U	0.12	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethene	75-35-4	<6	6 to <60	60 and above	ug/m3	3.2	U	0.16	U	0.32	U	0.32	U	0.32	U
1,2,4-Trichlorobenzene	120-82-1				ug/m3	10	U	0.51	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene	95-63-6				ug/m3	6.3	U	1.2	D	0.63	U	0.63	U	0.63	U
1,2-Dibromoethane (Ethylene dibromide)	106-93-4				ug/m3	6	U	0.3	U	0.6	U	0.6	U	0.6	U
1,2-Dichlorobenzene	95-50-1				ug/m3	5.8	U	0.29	U	0.58	U	0.58	U	0.58	U
1,2-Dichloroethane	107-06-2				ug/m3	3.1	U	0.15	U	0.31	U	0.31	U	0.31	U
1,2-Dichloropropane	78-87-5				ug/m3	3.3	U	0.16	U	0.33	U	0.33	U	0.33	U
1,2-Dichlorotetrafluoroethane	76-14-2				ug/m3	7	U	0.35	U	0.7	U	0.7	U	0.7	U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8				ug/m3	6.2	U	0.37	JD	0.62	U	0.92	JD	1.1	D
1,3-Butadiene	106-99-0				ug/m3	2.8	U	0.14	U	0.28	U	0.28	U	0.28	U
1,3-Dichlorobenzene	541-73-1				ug/m3	6.2	U	0.31	U	0.62	U	0.62	U	0.62	U
1,4-Dichlorobenzene	106-46-7				ug/m3	7.3	U	2.1	D	0.73	U	0.73	U	0.73	U
1,4-Dioxane	123-91-1				ug/m3	46	U	2.3	U	4.6	U	4.6	U	4.6	U
2-Butanone	78-93-3				ug/m3	20	JD	7.1	JD	15	JD	12	JD	12	JD
2-Hexanone	591-78-6				ug/m3	4.9	U	0.24	U	0.49	U	0.49	U	0.49	U
4-Ethyltoluene	622-96-8				ug/m3	6	U	0.36	JD	0.6	U	0.6	U	0.6	U
4-Methyl-2-Pentanone	108-10-1				ug/m3	3.9	U	0.2	U	0.39	U	0.39	U	0.39	U
Acetone	67-64-1				ug/m3	66	U	12	D	6.6	U	6.6	U	6.6	U
Benzene	71-43-2				ug/m3	2.6	U	0.5	D	1.1	D	1.6	D	0.79	D
Benzyl Chloride	100-44-7				ug/m3	2.3	U	0.11	U	0.23	U	0.23	U	0.23	U
Bromodichloromethane	75-27-4				ug/m3	4.9	U	0.25	U	0.49	U	0.49	U	0.49	U
Bromoform	75-25-2				ug/m3	9.3	U	0.47	U	0.93	U	0.93	U	0.93	U
Bromomethane	74-83-9				ug/m3	5.3	U	0.27	U	0.53	U	0.53	U	0.53	U
Carbon Disulfide	75-15-0				ug/m3	250	D	2.9	JD	13	D	12	D	13	D
Carbon Tetrachloride	56-23-5	<6	6 to <60	60 and above	ug/m3	4.1	U	0.55	JD	0.41	U	0.41	U	0.41	U
Chlorobenzene	108-90-7				ug/m3	4.5	U	0.23	U	0.45	U	0.45	U	0.45	U
Chlorodibromomethane	124-48-1				ug/m3	5.7	U	0.28	U	0.57	U	0.57	U	0.57	U
Chloroethane	75-00-3				ug/m3	3.2	U	0.16	U	0.32	U	0.32	U	0.32	U
Chloroform	67-66-3				ug/m3	14	D	0.18	U	0.36	U	0.36	U	0.36	U
Chloromethane	74-87-3				ug/m3	2.8	U	1.4	D	0.28	U	0.28	U	0.28	U
Cis-1,2-Dichloroethene	156-59-2	<6	6 to <60	60 and above	ug/m3	3.2	U	0.16	U	0.54	JD	0.71	JD	0.32	U
Cis-1,3-Dichloropropene	10061-01-5				ug/m3	3.2	U	0.16	U	0.32	U	0.32	U	0.32	U
Cyclohexane	110-82-7				ug/m3	4.9	U	0.24	U	230	D	230	D	40	D
Dichlorodifluoromethane	75-71-8				ug/m3	70	D	1.8	D	0.43	U	0.43	U	0.43	U
Dichloromethane	75-09-2	<100	100 to <1000	1000 and above	ug/m3	8.4	U	0.61	JD	0.84	U	0.84	U	0.84	U
Ethanol	64-17-5				ug/m3	67	U	12	D	6.7	U	6.7	U	24	D
Ethyl Acetate	141-78-6				ug/m3	5.4	U	0.27	U	0.54	U	0.54	U	0.54	U
Ethylbenzene	100-41-4				ug/m3	5	U	0.33	JD	2.8	D	2.5	D	21	D
Freon 113	76-13-1				ug/m3	9.3	U	0.46	U	0.93	U	0.93	U	0.93	U
Hexachlorobutadiene	87-68-3				ug/m3	9.8	U	0.49	U	0.98	U	0.98	U	0.98	U
Isopropanol	67-63-0				ug/m3	6	U	0.3	U	0.6	U	0.6	U	0.6	U
m,p-Xylene	179601-23-1				ug/m3	10	U	1.1	D	9.2	D	8.4	D	110	D
Methyl T-Butyl Ether (MTBE)	1634-04-4				ug/m3	3.6	U	0.18	U	0.36	U	0.36	U	0.36	U
Naphthalene	91-20-3				ug/m3	8	U	0.4	U	0.8	U	0.8	U	0.8	U
N-Heptane	142-82-5				ug/m3	4.8	U	0.24	U	60	D	62	D	3.1	D
N-Hexane	110-54-3				ug/m3	12	U	0.62	U	440	D	430	D	95	D
O-Xylene	95-47-6				ug/m3	5.4	U	0.52	D	4	D	3.9	D	30	D
Propylene	115-07-1				ug/m3	3.4	U	4.7	JD	0.34	U	0.34	U	0.34	U
Styrene	100-42-5				ug/m3	5.3	U	0.26	U	0.53	U	0.53	U	0.53	U
Tetrachloroethene	127-18-4	<100	100 to <1000	1000 and above	ug/m3	29	D	0.38	U	3.1	D	2.8	D	**240**	D
Tetrahydrofuran	109-99-9				ug/m3	3.9	U	0.2	U	0.39	U	0.39	U	0.39	U
Toluene	108-88-3				ug/m3	5.7	JD	0.8	D	3.9	D	0.39	U	5.2	D
Trans-1,2-Dichloroethene	156-60-5				ug/m3	3.2	U	0.16	U	0.32	U	0.32	U	0.32	U
Trans-1,3-Dichloropropene	10061-02-6				ug/m3	3.3	U	0.17	U	0.33	U	0.33	U	0.33	U
Trichloroethylene	79-01-6	<6	6 to <60	60 and above	ug/m3	**10000**	D	1.8	D	2.8	D	0.43	U	0.43	U
Trichlorofluoromethane	75-69-4				ug/m3	85	D	1.7	JD	0.65	U	0.65	U	0.65	U
Vinyl Acetate	108-05-4				ug/m3	3.4	U	0.17	U	0.34	U	0.34	U	0.34	U
Vinyl Chloride	75-01-4	<6	6 to <60	60 and above	ug/m3	3.2	U	0.16	U	0.32	U	0.32	U	0.32	U

Note:
VALUE indicates the result is non-detect.
VALUE indicates the result exceeds the lowest sub-slab vapor criteria.

Table 5
Soil Vapor Sample Results Notes
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

Qualifiers	Definitions
D	Indicates the result was run as a dilution.
J	Indicates an estimated value.
U	Indicates result was not detected. Reporting detection limit is listed instead.

Criteria	Applicable Criteria	Defintions
NYSDEC 703.5/TOGS Standards	Sub-Slab Vapor Concentration	Decision matrix sub-slab criteria for the applicable analyte.

Notes:

Criteria are taken from the NYSDEC Soil Vapor/Indoor Air Decision Matrices (rev. May 2017):
https://health.ny.gov/environmental/indoors/vapor_intrusion/docs/svi_decision_matrices_abc.pdf

Samples have been compared to the Air Decision Matrix according to their sample type, as shown:

Sub-Slab:

VALUE	The result is non-detect.
VALUE	The result exceeds the lowest criteria of the indoor air criteria.
VALUE	The result is non-detect but the reporting limit exceeds the lowest criteria of the indoor air criteria.

HDR

Table 6
December 2019 Sub-Slab Results
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

Analyte	CAS Number	NYSDOH Soil Vapor/Indoor Air Decision Matrices May 2017						Units	AA-197N8TH-20191212		AA-505DRIGGS-20191209-0		SS-197N8TH-20191212		SS-505DRIGGS-20191209-0		SS-505DRIGGS-20191209-1	
								Location:	197 N 8th St		505 Driggs Ave		197 N 8th St		505 Driggs Ave		505 Driggs Ave DUP	
								Sample Type:	Indoor Air		Indoor Air		Sub-Slab		Sub-Slab		Sub-Slab	
								Sample Date:	12/12/2019		12/9/2019		12/12/2019		12/9/2019		12/9/2019	
		Indoor Air Concentration			Sub-Slab Vapor Concentration													
Analyte	CAS Number							Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Volatile Organic Compounds																		
1,1,1-Trichloroethane	71-55-6	<3	3 to <10	10 and above	<100	100 to <1000	1000 and above	ug/m3	0.072	U	0.072	U	0.2	U	0.2	U	0.2	U
1,1,2,2-Tetrachloroethane	79-34-5							ug/m3	0.11	U	0.11	U	0.3	U	0.3	U	0.3	U
1,1,2-Trichloroethane	79-00-5							ug/m3	0.079	U	0.079	U	0.22	U	0.22	U	0.22	U
1,1-Dichloroethane	75-34-3							ug/m3	0.043	U	0.043	U	0.12	U	0.12	U	0.12	U
1,1-Dichloroethene	75-35-4	<0.2	0.2 to <1	1 and above	<6	6 to <60	60 and above	ug/m3	0.076	U	0.076	U	0.22	U	0.22	U	0.22	U
1,2,4-Trichlorobenzene	120-82-1							ug/m3	0.18	U	0.18	U	0.51	U	0.51	U	0.51	U
1,2,4-Trimethylbenzene	95-63-6							ug/m3	0.11	U	7.6	D	0.31	U	8.9	D	8.8	D
1,2-Dibromoethane (Ethylene dibromide)	106-93-4							ug/m3	0.11	U	0.11	U	0.3	U	0.3	U	0.3	U
1,2-Dichlorobenzene	95-50-1							ug/m3	0.1	U	0.1	U	0.29	U	0.29	U	0.29	U
1,2-Dichloroethane	107-06-2							ug/m3	0.054	U	0.054	U	0.15	U	0.15	U	0.15	U
1,2-Dichloropropane	78-87-5							ug/m3	0.057	U	0.057	U	0.16	U	0.16	U	0.16	U
1,2-Dichlorotetrafluoroethane	76-14-2							ug/m3	0.14	U	0.14	U	0.39	U	0.39	U	0.39	U
1,3,5-Trimethylbenzene (Mesitylene)	108-67-8							ug/m3	0.15	JD	2.3	D	0.31	U	3.8	D	3.8	D
1,3-Butadiene	106-99-0							ug/m3	0.057	U	0.057	U	0.16	U	0.16	U	0.16	U
1,3-Dichlorobenzene	541-73-1							ug/m3	0.11	U	0.11	U	0.31	U	0.31	U	0.31	U
1,4-Dichlorobenzene	106-46-7							ug/m3	0.13	U	0.13	U	0.37	U	1.8	D	1.8	D
1,4-Dioxane	123-91-1							ug/m3	0.82	U	0.82	U	2.3	U	2.3	U	2.3	U
2-Butanone	78-93-3							ug/m3	1.4	JD	38	D	0.67	JD	1.1	JD	1.1	JD
2-Hexanone	591-78-6							ug/m3	0.085	U	0.085	U	0.24	U	0.24	U	0.24	U
4-Ethyltoluene	622-96-8							ug/m3	0.42	D	6.9	D	0.3	U	4.9	D	4.8	D
4-Methyl-2-Pentanone	108-10-1							ug/m3	0.32	D	0.075	U	0.21	U	0.21	U	0.21	U
Acetone	67-64-1							ug/m3	15	D	5000	D	6.1	JD	13	D	12	D
Benzene	71-43-2							ug/m3	0.64	D	1.2	D	0.42	D	0.44	D	0.49	D
Benzyl Chloride	100-44-7							ug/m3	0.047	U	0.047	U	0.13	U	0.13	U	0.13	U
Bromodichloromethane	75-27-4							ug/m3	0.087	U	0.087	U	0.25	U	0.25	U	0.25	U
Bromoform	75-25-2							ug/m3	0.16	U	0.16	U	0.47	U	0.47	U	0.47	U
Bromomethane	74-83-9							ug/m3	0.094	U	0.094	U	0.27	U	0.27	U	0.27	U
Carbon Disulfide	75-15-0							ug/m3	0.075	U	0.075	U	0.21	U	0.21	U	0.21	U
Carbon Tetrachloride	56-23-5	<0.2	0.2 to <1	1 and above	<6	6 to <60	60 and above	ug/m3	**0.37**	D	**0.39**	D	0.26	JD	0.21	U	0.21	U
Chlorobenzene	108-90-7							ug/m3	0.079	U	0.079	U	0.23	U	0.23	U	0.23	U
Chlorodibromomethane	124-48-1							ug/m3	0.099	U	0.099	U	0.28	U	0.28	U	0.28	U
Chloroethane	75-00-3							ug/m3	0.091	U	0.091	U	0.26	U	0.26	U	0.26	U
Chloroform	67-66-3							ug/m3	0.33	D	0.064	U	0.52	D	1.3	D	1.3	D
Chloromethane	74-87-3							ug/m3	0.049	U	0.049	U	0.14	U	0.14	U	0.14	U
Cis-1,2-Dichloroethene	156-59-2	<0.2	0.2 to <1	1 and above	<6	6 to <60	60 and above	ug/m3	0.057	U	0.057	U	0.37	JD	0.16	U	0.16	U
Cis-1,3-Dichloropropene	10061-01-5							ug/m3	0.056	U	0.056	U	0.16	U	0.16	U	0.16	U
Cyclohexane	110-82-7							ug/m3	0.086	U	0.086	U	0.24	U	0.24	U	0.24	U
Dichlorodifluoromethane	75-71-8							ug/m3	1.9	D	1.4	D	2.5	D	0.21	U	0.21	U
Dichloromethane	75-09-2	<3	3 to <10	10 and above	<100	100 to <1000	1000 and above	ug/m3	0.67	JD	**110**	D	0.42	U	0.85	JD	0.69	JD
Ethanol	64-17-5							ug/m3	100	D	1600	D	3.4	U	6.9	JD	8.3	D
Ethyl Acetate	141-78-6							ug/m3	0.094	U	270	D	0.27	U	0.27	U	0.27	U
Ethylbenzene	100-41-4							ug/m3	0.45	D	67	D	0.25	U	2.8	D	2.7	D
Freon 113	76-13-1							ug/m3	0.39	JD	0.2	U	0.58	U	0.58	U	0.58	U
Hexachlorobutadiene	87-68-3							ug/m3	0.17	U	0.17	U	0.49	U	0.49	U	0.49	U
Isopropanol	67-63-0							ug/m3	6.1	D	0.16	U	0.45	U	0.63	JD	0.59	JD
m,p-Xylene	179601-23-1							ug/m3	1.3	D	250	D	0.67	JD	15	D	15	D
Methyl T-Butyl Ether (MTBE)	1634-04-4							ug/m3	0.064	U	0.064	U	0.18	U	0.18	U	0.18	U
Naphthalene	91-20-3							ug/m3	0.2	D	0.8	D	0.4	U	1.1	D	0.88	D
N-Heptane	142-82-5							ug/m3	0.4	D	8.6	D	0.37	JD	0.4	JD	0.4	JD
N-Hexane	110-54-3							ug/m3	0.22	U	0.22	U	0.62	U	0.62	U	0.62	U
O-Xylene	95-47-6							ug/m3	0.44	D	48	D	0.27	U	8.5	D	8.6	D
Propylene	115-07-1							ug/m3	0.11	U	0.11	U	0.32	U	0.32	U	0.32	U
Styrene	100-42-5							ug/m3	0.092	U	6.1	D	0.26	U	0.26	U	0.26	U
Tetrachloroethene	127-18-4	<3	3 to <10	10 and above	<100	100 to <1000	1000 and above	ug/m3	0.4	D	1.1	D	0.73	D	1	D	1	D
Tetrahydrofuran	109-99-9							ug/m3	0.49	D	0.1	U	0.29	U	0.29	U	0.29	U
Toluene	108-88-3							ug/m3	3	D	900	D	1.1	D	3.4	D	3.2	D
Trans-1,2-Dichloroethene	156-60-5							ug/m3	0.056	U	0.056	U	0.16	U	0.16	U	0.16	U
Trans-1,3-Dichloropropene	10061-02-6							ug/m3	0.058	U	0.058	U	0.17	U	0.17	U	0.17	U
Trichloroethylene	79-01-6	<0.2	0.2 to <1	1 and above	<6	6 to <60	60 and above	ug/m3	0.076	U	0.076	U	40	D	0.22	U	0.22	U
Trichlorofluoromethane	75-69-4							ug/m3	2.2	D	1	D	1.3	JD	0.93	JD	0.94	JD
Vinyl Acetate	108-05-4							ug/m3	0.077	U	0.077	U	0.22	U	0.22	U	0.22	U
Vinyl Chloride	75-01-4	<0.2		0.2 and above	<6	6 to <60	60 and above	ug/m3	0.057	U	0.057	U	0.16	U	0.16	U	0.16	U

Qualifiers:
J - result is estimated.
D - result is diluted.
U - result is non-detect.

Table 6
December 2019 Sub-Slab Results Notes
Former Sterling Transformer Corp., Off-Site
510 Driggs Ave., Brooklyn, NY

Qualifiers	Definitions
D	Indicates the result was run as a dilution.
J	Indicates an estimated value.
U	Indicates result was not detected. Reporting detection limit is listed instead.

Criteria	Applicable Criteria	Defintions
NYSDEC 703.5/TOGS Standards	Indoor Air Concentration	Decision matrix indoor air criteria for the applicable analyte.
	Sub-Slab Vapor Concentration	Decision matrix sub-slab criteria for the applicable analyte.

Notes:

Criteria are taken from the NYSDEC Soil Vapor/Indoor Air Decision Matrices (rev. May 2017):
https://health.ny.gov/environmental/indoors/vapor_intrusion/docs/svi_decision_matrices_abc.pdf

Samples have been compared to the Air Decision Matrix according to their sample type, as shown:

Indoor Air:

VALUE	The result is non-detect.
VALUE	The result exceeds the lowest criteria of the indoor air criteria.
VALUE	The result is non-detect but the reporting limit exceeds the lowest criteria of the indoor air criteria.

Sub-Slab Vapor:

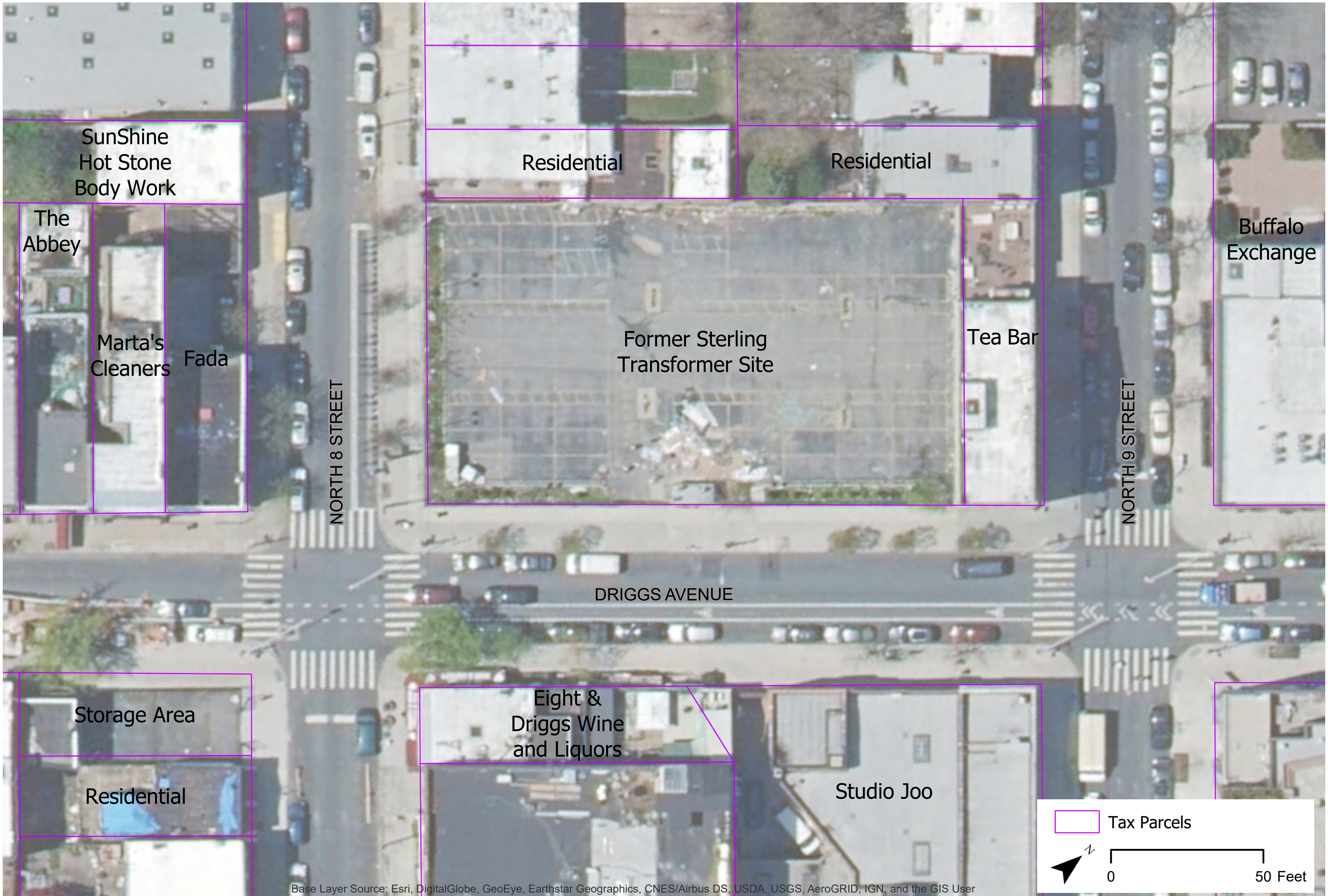
VALUE	The result is non-detect.
VALUE	The result exceeds the lowest criteria of the sub-slab vapor criteria.
VALUE	The result is non-detect but the reporting limit exceeds the lowest criteria of the sub-slab vapor criteria.

Figures

SITE LOCATION MAP

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 1



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SITE MAP

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 2

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE

Figure provided by Environmental Business Consultants

14MW6 9/8/15

VOCs (ug/L)	
Benzene	2.1
cis-1,2-Dichloroethene	16
Metals (mg/L)	
Aluminum	9.02
Iron	12.4
Manganese	0.468
Sodium	75.5

14MW4 9/9/15

VOCs (ug/L)	
cis-1,2-Dichloroethene	51
Metals (mg/L)	
Sodium	58.7

14MW7 9/8/15

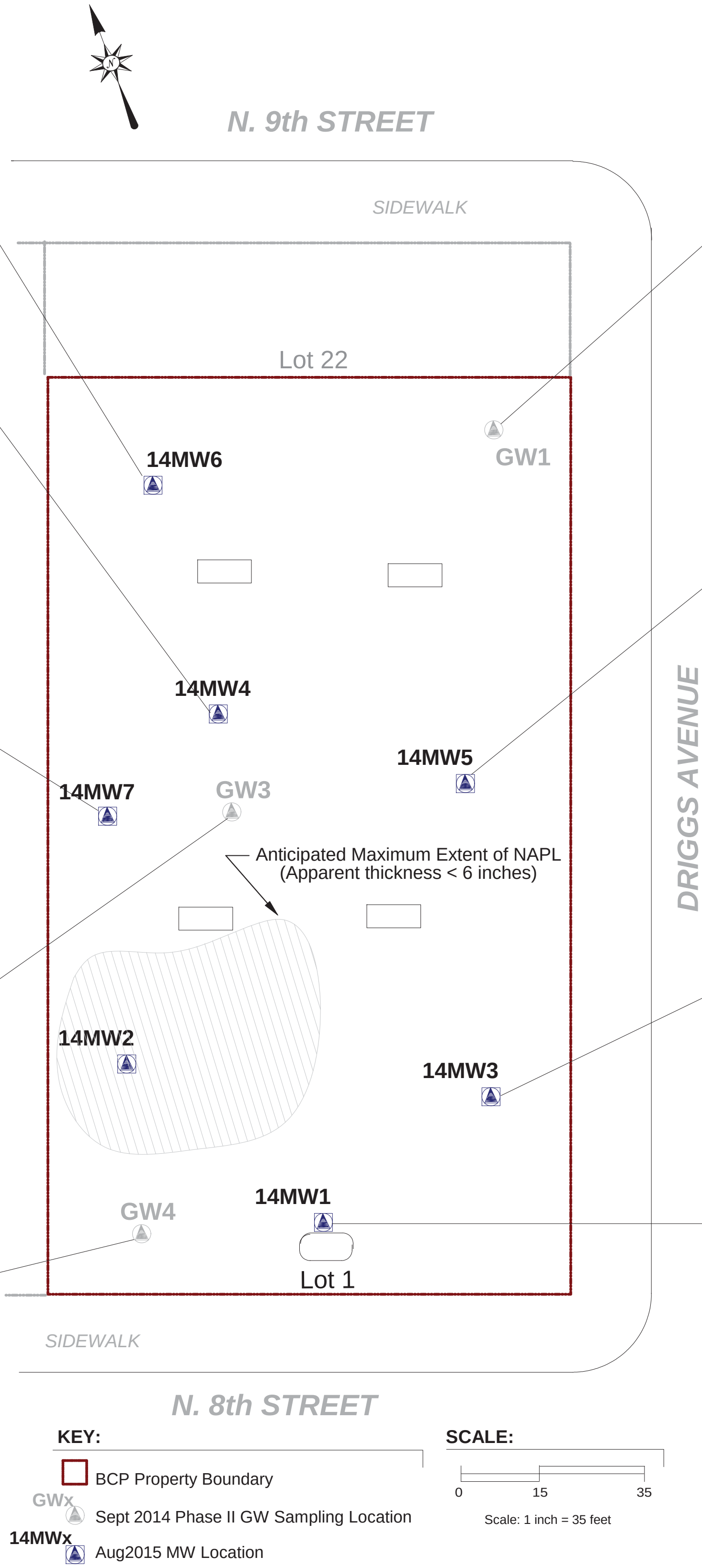
VOCs (ug/L)	
cis-1,2-Dichloroethene	14
SVOCs (ug/L)	
Benz(a)anthracene	0.02
Chrysene	0.02
Metals (mg/L)	
Aluminum	1.84
Iron	2.11
Manganese	0.496
Sodium	68.6

GW3 9/30/14

VOCs (ug/L)	
1,2,4-Trimethylbenzene	380
1,3,5-Trimethylbenzene	180
Benzene	4,300
cis-1,2-Dichloroethene	470
Ethylbenzene	350
m&p-Xylenes	1,600
Methylene chloride	16
Naphthalene	9,400
o-Xylene	570
Styrene	270
Toluene	3,800
Trichloroethene	27
Vinyl Chloride	530

GW4 9/30/14

VOCs (ug/L)	
1,2,4-Trimethylbenzene	110
1,3,5-Trimethylbenzene	52
Benzene	730
Ethylbenzene	270
Isopropylbenzene	15
m&p-Xylenes	520
Naphthalene	2,000
o-Xylene	230
Styrene	13
Toluene	630
Vinyl Chloride	4.3



GW1 9/30/14

VOCs (ug/L)	
cis-1,2-Dichloroethene	18
Trichloroethene	18
Vinyl Chloride	2.5

14MW5 9/8/15

VOCs (ug/L)	
cis-1,2-Dichloroethene	8.4
SVOCs (ug/L)	
Benz(a)anthracene	0.03
Benzo(a)pyrene	0.02
Benzo(b)fluoranthene	0.02
Chrysene	0.02
Metals (mg/L)	
Aluminum	1.65
Iron	2.75
Manganese	0.358

14MW3 9/9/15

VOCs (ug/L)	
1,1-Dichloroethene	5.8
Benzene	23
cis-1,2-Dichloroethene	1,200
trans-1,2-Dichloroethene	12
Trichloroethene	12
Vinyl Chloride	470
SVOCs (ug/L)	
Benz(a)anthracene	0.35
Benzo(b)fluoranthene	0.2
Benzo(k)fluoranthene	0.27
Chrysene	0.31
Indeno(1,2,3-cd)pyrene	0.18
Metals (mg/L)	
Iron	2.4
Sodium	84.1

14MW1 9/9/15

VOCs (ug/L)	
Benzene	18
cis-1,2-Dichloroethene	70
trans-1,2-Dichloroethene	6.3
Trichloroethene	6.3
Vinyl Chloride	36
Metals (mg/L)	
Iron	2.38
Manganese	0.38
Sodium	110

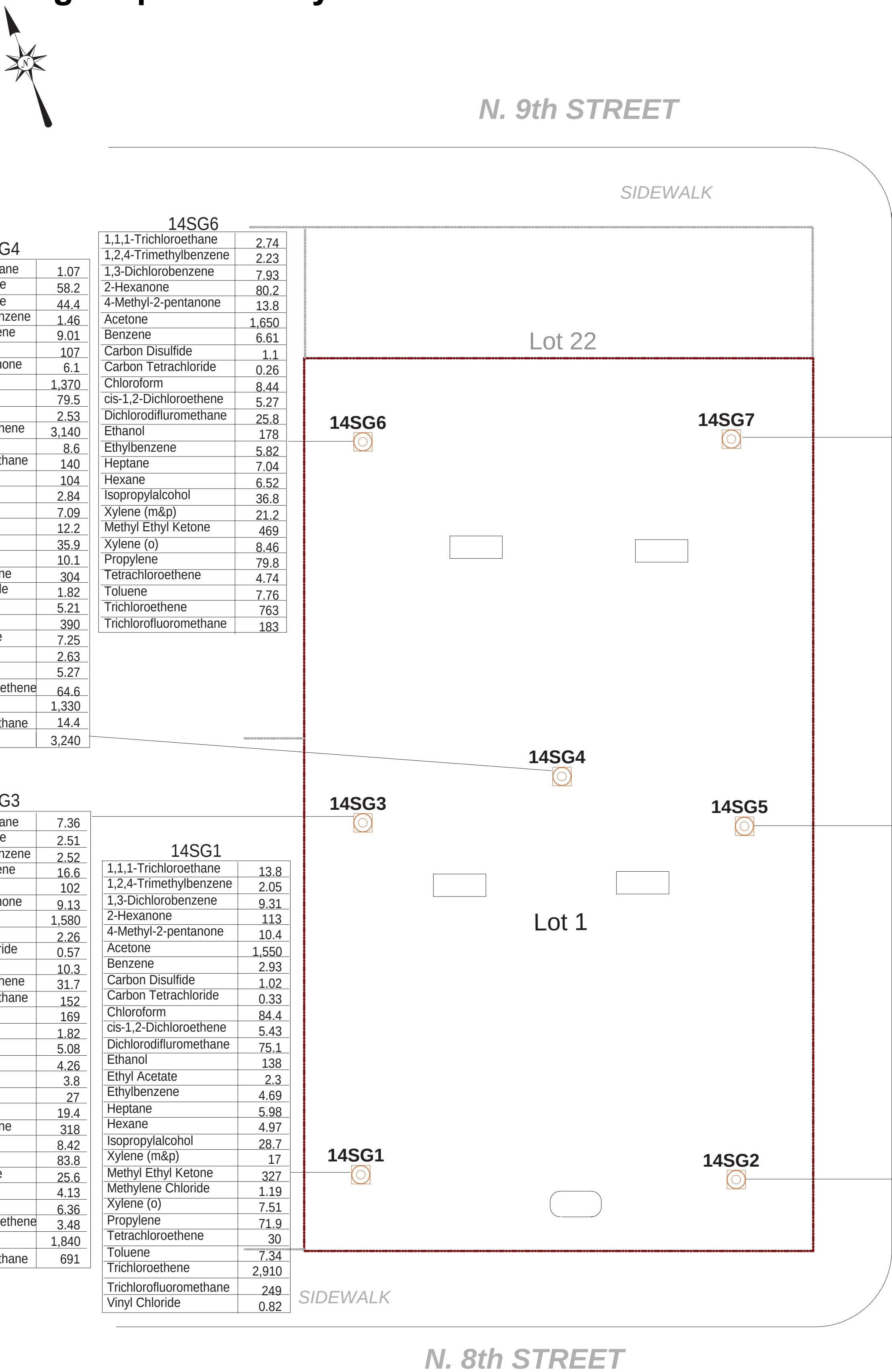
EXISTING ON-SITE WELLS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 3

PATH: \\NJ-MAHWAH\ACTIVEPROJECTS\4492\10116316\7.0_GIS_MODELS\7.2_WIP\MAP_DOCS\DRAFT\FST\FST.APRX - USER: HROSADO - DATE: 1/21/2020

Figure provided by Environmental Business Consultants



14SG7

1,1,1-Trichloroethane	2.21
1,1-Dichloroethane	25.2
1,1-Dichloroethene	586
1,2,4-Trimethylbenzene	1.89
1,3-Dichlorobenzene	5.57
2-Hexanone	67.5
4-Methyl-2-pentanone	9.62
Acetone	1,510
Benzene	390
Chloroethane	33.2
Chloroform	1.73
Chloromethane	1.4
cis-1,2-Dichloroethene	4,200
Cyclohexane	172
Dichlorodifluromethane	47
Ethanol	84
Ethylbenzene	4.34
Hexane	262
Isopropylalcohol	20.9
Xylene (m&p)	11.5
Methyl Ethyl Ketone	162
Methylene Chloride	20
Xylene (o)	6.94
Propylene	5,610
Tetrachloroethene	23.4
Toluene	11.3
trans-1,2-Dichloroethene	128
Trichloroethene	6,120
Trichlorofluoromethane	14.1
Vinyl Chloride	10,800

14SG6

1,1,1-Trichloroethane	2.74
1,2,4-Trimethylbenzene	2.23
1,3-Dichlorobenzene	7.93
2-Hexanone	80.2
4-Methyl-2-pentanone	13.8
Acetone	1,650
Benzene	6.61
Carbon Disulfide	1.1
Carbon Tetrachloride	0.26
Chloroform	8.44
cis-1,2-Dichloroethene	5.27
Dichlorodifluromethane	25.8
Ethanol	178
Ethylbenzene	5.82
Heptane	7.04
Hexane	6.52
Isopropylalcohol	36.8
Xylene (m&p)	21.2
Methyl Ethyl Ketone	469
Xylene (o)	8.46
Propylene	79.8
Tetrachloroethene	4.74
Toluene	7.76
Trichloroethene	763
Trichlorofluoromethane	183

14SG4

1,1,1-Trichloroethane	1.07
1,1-Dichloroethane	58.2
1,1-Dichloroethene	44.4
1,2,4-Trimethylbenzene	1.46
1,3-Dichlorobenzene	9.01
2-Hexanone	107
4-Methyl-2-pentanone	6.1
Acetone	1,370
Benzene	79.5
Chloroform	2.53
cis-1,2-Dichloroethene	3,140
Cyclohexane	8.6
Dichlorodifluromethane	140
Ethanol	104
Ethylbenzene	2.84
Heptane	7.09
Hexane	12.2
Isopropylalcohol	35.9
Xylene (m&p)	10.1
Methyl Ethyl Ketone	304
Methylene Chloride	1.82
Xylene (o)	5.21
Propylene	390
Tetrachloroethene	7.25
Tetrahydrofuran	2.63
Toluene	5.27
trans-1,2-Dichloroethene	64.6
Trichloroethene	1,330
Trichlorofluoromethane	14.4
Vinyl Chloride	3,240

14SG5

1,1,1-Trichloroethane	2.02
1,1-Dichloroethane	54.6
1,1-Dichloroethene	1,100
1,2,4-Trimethylbenzene	1.72
1,3-Dichlorobenzene	5.62
Acetone	1,410
Benzene	1,240
Chloroethane	245
cis-1,2-Dichloroethene	44,400
Cyclohexane	396
Dichlorodifluromethane	90.9
Ethanol	97.9
Ethyl Acetate	2.36
Ethylbenzene	4.86
Heptane	9.71
Hexane	722
Isopropylalcohol	19.6
Isopropylbenzene	2.36
Xylene (m&p)	16.4
Xylene (o)	10.2
Propylene	3,780
Tetrachloroethene	8.74
Toluene	30.5
trans-1,2-Dichloroethene	1,380
Trichloroethene	5,690
Trichlorofluoromethane	19.9
Vinyl Chloride	116,000

14SG3

1,1,1-Trichloroethane	7.36
1,1-Dichloroethane	2.51
1,2,4-Trimethylbenzene	2.52
1,3-Dichlorobenzene	16.6
2-Hexanone	102
4-Methyl-2-pentanone	9.13
Acetone	1,580
Benzene	2.26
Carbon Tetrachloride	0.57
Chloroform	10.3
cis-1,2-Dichloroethene	31.7
Dichlorodifluromethane	152
Ethanol	169
Ethyl Acetate	1.82
Ethylbenzene	5.08
Heptane	4.26
Hexane	3.8
Isopropylalcohol	27
Xylene (m&p)	19.4
Methyl Ethyl Ketone	318
Xylene (o)	8.42
Propylene	83.8
Tetrachloroethene	25.6
Tetrahydrofuran	4.13
Toluene	6.36
trans-1,2-Dichloroethene	3.48
Trichloroethene	1,840
Trichlorofluoromethane	691

14SG1

1,1,1-Trichloroethane	13.8
1,2,4-Trimethylbenzene	2.05
1,3-Dichlorobenzene	9.31
2-Hexanone	113
4-Methyl-2-pentanone	10.4
Acetone	1,550
Benzene	2.93
Carbon Disulfide	1.02
Carbon Tetrachloride	0.33
Chloroform	84.4
cis-1,2-Dichloroethene	5.43
Dichlorodifluromethane	75.1
Ethanol	138
Ethyl Acetate	2.3
Ethylbenzene	4.69
Heptane	5.98
Hexane	4.97
Isopropylalcohol	28.7
Xylene (m&p)	17
Methyl Ethyl Ketone	327
Methylene Chloride	1.19
Xylene (o)	7.51
Propylene	71.9
Tetrachloroethene	30
Toluene	7.34
Trichloroethene	2,910
Trichlorofluoromethane	249
Vinyl Chloride	0.82

14SG2

1,1,1-Trichloroethane	86.2
1,1-Dichloroethane	4.77
1,2,4-Trimethylbenzene	2.67
1,3-Dichlorobenzene	11
2-Hexanone	148
4-Methyl-2-pentanone	10.4
Acetone	2,920
Benzene	6.93
Carbon Disulfide	1.75
Carbon Tetrachloride	0.35
Chloroform	165
Chloromethane	2.33
cis-1,2-Dichloroethene	452
Dichlorodifluromethane	32.8
Ethanol	215
Ethyl Acetate	7.02
Ethylbenzene	5.12
Heptane	13.9
Hexane	11.9
Isopropylalcohol	75.4
Xylene (m&p)	18.3
Methyl Ethyl Ketone	796
Methylene Chloride	4.3
Xylene (o)	7.68
Propylene	104
Styrene	1.08
Tetrachloroethene	113
Tetrahydrofuran	1.69
Toluene	17.6
trans-1,2-Dichloroethene	13.7
Trichloroethene	16,900
Trichlorofluoromethane	62.9

KEY:

BCP Property Boundary

14SGx Soil Gas Location

All Results in (ug/m³)

SCALE:

0 15 30

Scale: 1 inch = 30 feet

EXISTING ON-SITE SOIL VAPOR POINTS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 4

HDR

OFF-SITE RI MONITORING WELL LOCATIONS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 5

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE

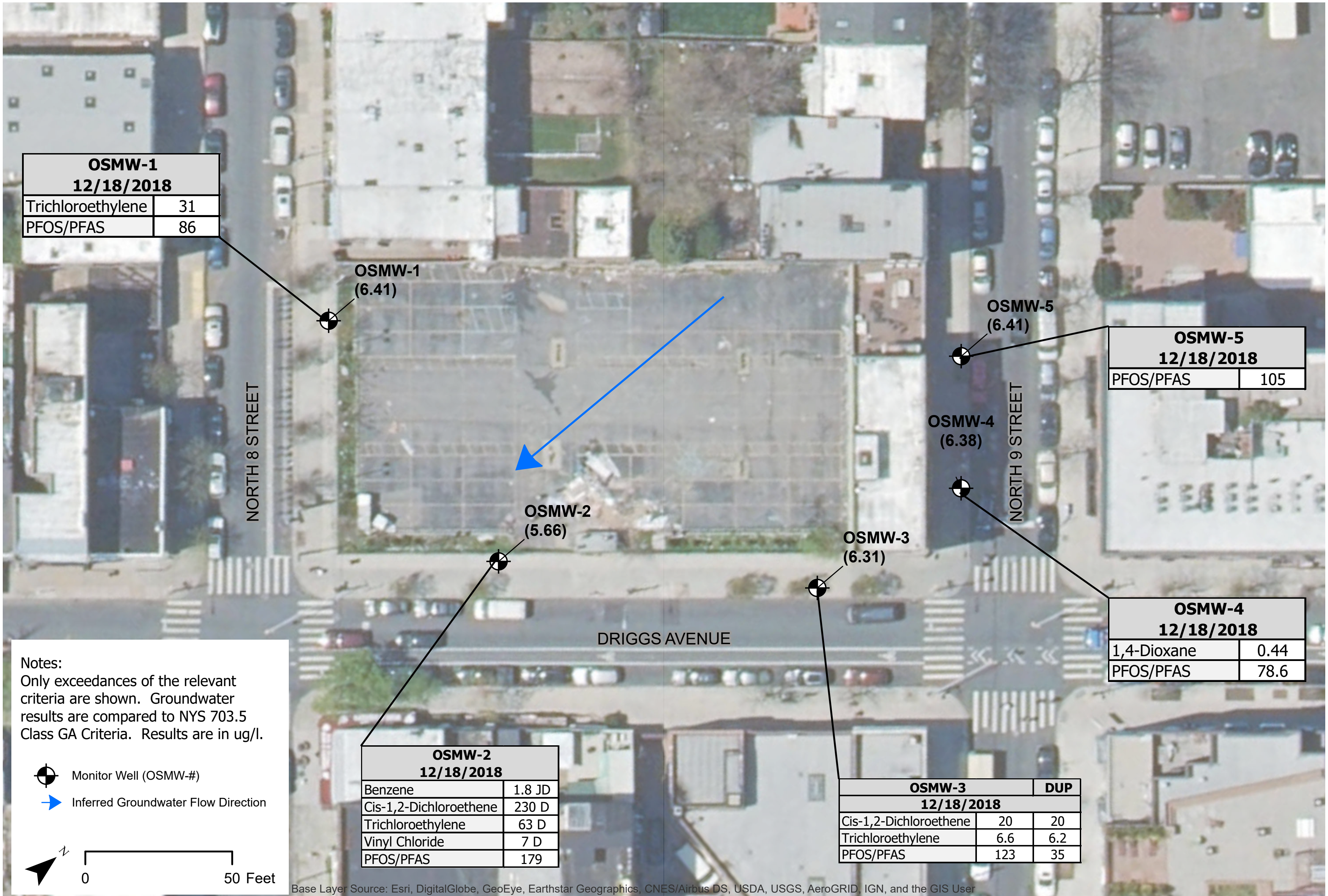
OFF-SITE RI SOIL VAPOR POINT LOCATIONS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 6

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE



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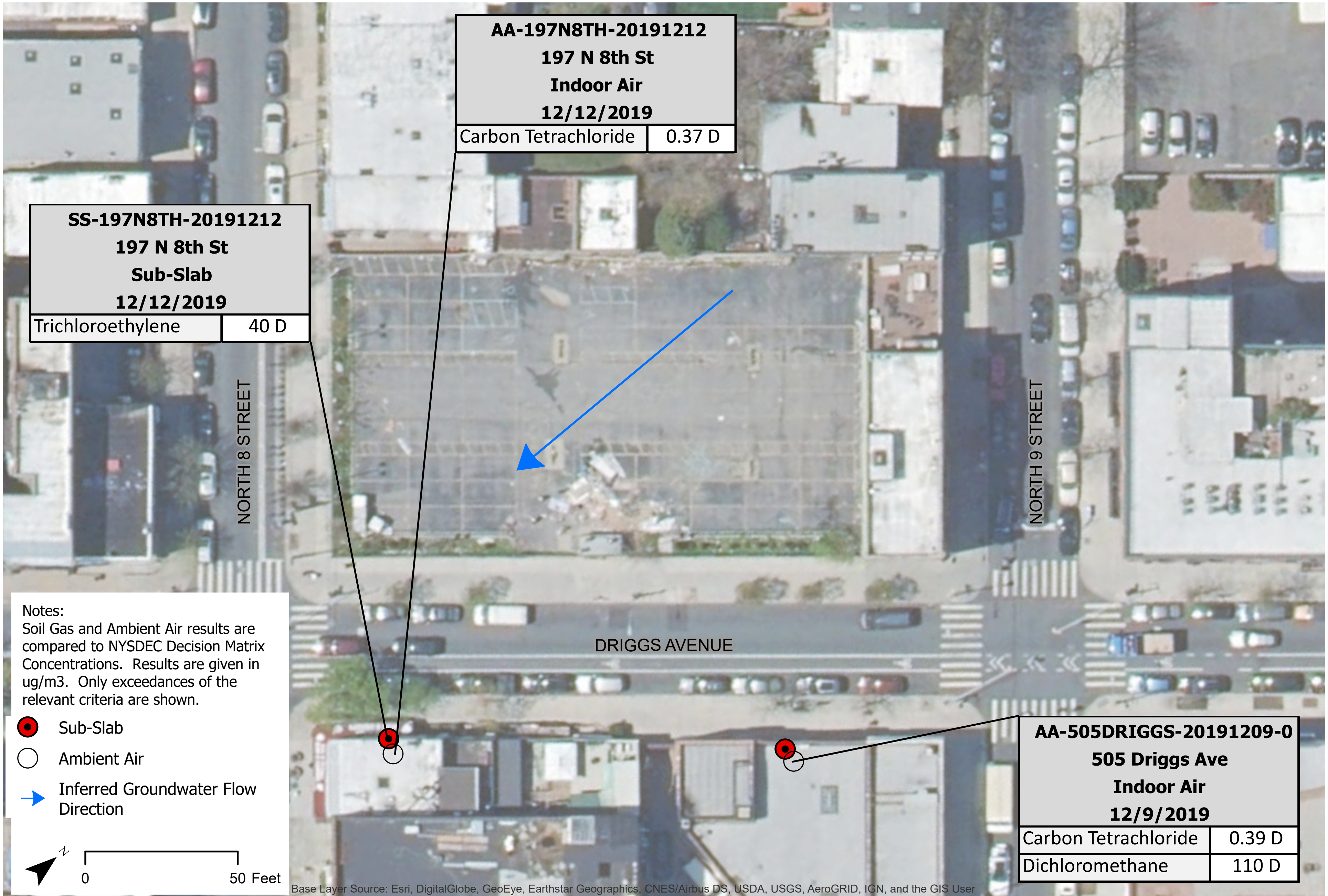
OFF-SITE RI GROUNDWATER SAMPLE RESULTS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 7

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE



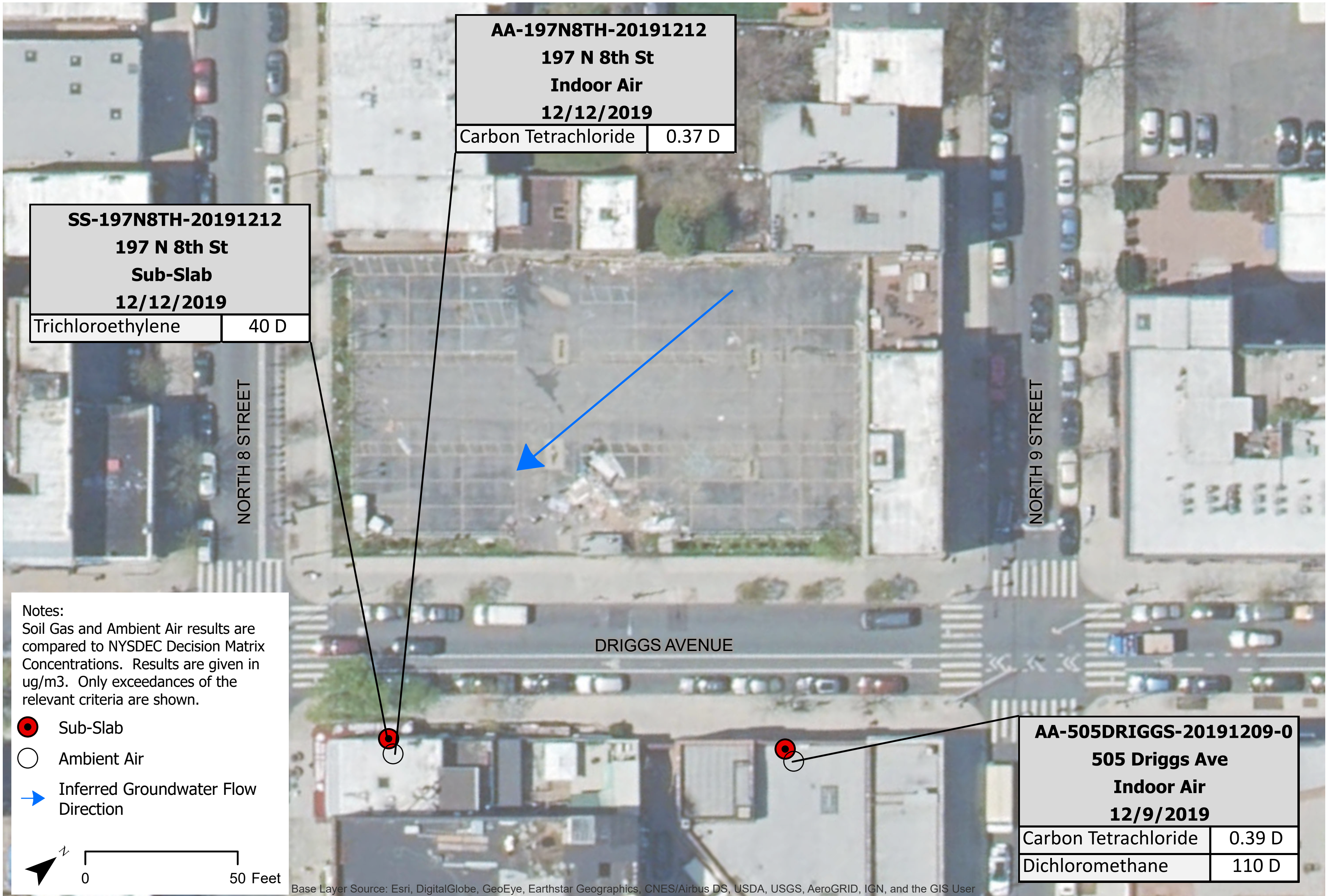
OFF-SITE RI SOIL VAPOR POINT SAMPLE RESULTS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 8

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE



HDR

OFF-SITE RI SUB-SLAB AND INDOOR AIR SAMPLE RESULTS

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 9

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FORMER STERLING TRANSFORMER CORP., OFF-SITE

GROUNDWATER ELEVATION DATA

NYSDEC SITE# C224203. 510 DRIGGS AVE, BROOKLYN, NY

FIGURE 10

Path \\nj-mahwah\ActiveProjects\4492\10116316\7.0_GIS_Models\7.2_WIP\Map_Docs\Draft\FST\FST.aprx

FORMER STERLING TRANSFORMER CORP., OFF-SITE

Appendix A

Historic Site Information and Reports

A.1 BCP Significant Threat Determination Report

A.2 Supplemental Geotechnical Report