HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: Meeker Avenue Plume

EPA ID No. NYN000203407

Contact Persons

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Pathways, Components or Threats Not Scored

The ground water migration pathway, the surface water migration pathway, the soil exposure and subsurface intrusion pathway—soil exposure component, and the air migration pathway were not scored because the listing decision is not affected significantly by those pathways or components. The site score is sufficient to list the site based on the subsurface intrusion component of the soil exposure and subsurface intrusion pathway. However, ground water migration is a pathway of concern at the site. The unscored pathways and components are described below; additional investigation of these pathways, if warranted, will be performed during a Remedial Investigation.

- **Ground Water Migration Pathway** – New York State Department of Environmental Conservation (NYSDEC) has conducted several subsurface investigations related to the Meeker Avenue Plume site since 2007. Groundwater analytical results show a contaminant release of chlorinated volatile organic compounds (CVOC) to the Upper Glacial aquifer. As documented in NYSDEC's investigation reports, groundwater sampling results for an extensive network of monitoring wells show the presence of cis-1,2-dichloroethylene (DCE); tetrachloroethylene (PCE), trichloroethylene (TCE), and vinyl chloride at concentrations that exceed the maximum non-detect background levels, which were reported for all four contaminants in several groundwater samples collected from monitoring wells on the periphery of NYSDEC's investigation area. The CVOC contamination is encountered in both shallow and deep glacial deposits, indicating that it affects the full thickness of the Upper Glacial aquifer at the site. Dense nonaqueous phase liquid (DNAPL) has been encountered and sampled within the groundwater contamination area, as evidenced by PCE concentrations up to 3,500,000 micrograms per liter (µg/L) [Ref. 5, pp. 1–3; 6, pp. 6–8; 14, pp. 2–34, 87–90; 26, pp. 28–111, 177–181; 27, pp. 11–12, 15–20]. The shallow unconsolidated materials encountered at the site consist of sand and clayey silt/sand with a mean hydraulic conductivity of 8.03×10^{-3} centimeter per second (cm/s), and sandy silt with a mean hydraulic conductivity of 3.15×10^{-4} cm/s [Ref. 26, pp. 136, 230]. Although the release to groundwater is documented, the groundwater in New York City is not used as a potable drinking water supply and there are no drinking water wells located within the Meeker Avenue Plume site study area [Ref. 21, p. 19; 26, p. 69; 29, pp. 54–55].

- **Surface Water Migration Pathway** – The nearest surface water body is Newtown Creek east of the site. The shoreline of Newtown Creek consists of bulkhead materials such as concrete, metal, wood, riprap, and rocks. Most natural streamflow to the creek has been eliminated; watershed drainage is dominated by groundwater discharge, combined sewer overflow (CSO) discharges, more than 300 private point source discharge pipes, and overland flow. The shortest distance from the documented groundwater CVOC contamination to Newtown Creek is approximately 500 feet, and the contamination has a minimum depth of approximately 10 feet below ground surface (ft bgs). The site and surrounding area are mostly covered by impermeable surfaces such as pavement, and most stormwater is captured by combined sewers. Based on these considerations, there is no known overland flow path from the subsurface contamination to surface water. A release to the creek via groundwater discharge is possible. Groundwater flow is generally east and northeast toward Newtown Creek, and saline groundwater in the area indicates a connection between groundwater and the estuarine surface water. In the northern and northeastern portions of the site, operation of the ExxonMobil Off-Site Recovery System produces localized cones of depression around recovery wells and affects the natural groundwater flow direction. Newtown Creek is an existing Superfund site based on sediment contamination throughout the creek; however, CVOCs are not among the primary contaminants of concern associated with the Newtown Creek site. A summary of available Newtown Creek site data indicates that PCE, TCE, cis-1,2-DCE, and vinyl chloride have been detected in just 6.9%, 2.4%, 25%, and 3% of surface water samples, respectively. In surface sediment, PCE, TCE, and vinyl chloride were each detected in just 1.7% of samples, and cis-1,2-DCE was detected in just 8.1% of samples. Based on these results, EPA does not consider these CVOCs to be Contaminants of Potential Ecological Concern (COPEC) in Newtown Creek. The sporadic CVOC detections in Newtown Creek are not known to be attributable to the Meeker Avenue Plume site [Ref. 21, pp. 7, 14–15; 26, pp. 23–24, 69, 130; 29, pp. 52, 54; 30, pp. 55–56, 102–104, 356–357, 362–363].

- **Soil Exposure Component** – Throughout the course of its investigations associated with the site, NYSDEC has collected soil samples at soil boring and monitoring well locations, as well as at and in the vicinity of possible originating facilities. Some cis-1,2-DCE, PCE, TCE, and vinyl chloride results for soil samples within 2 feet of the ground surface exceed risk-based screening levels. However, the areas with contaminated soil generally are covered by essentially impenetrable materials (i.e., asphalt and concrete) and do not constitute areas of observed contamination to which residents, students, or workers are exposed [Ref. 5, pp. 1–3; 6, pp. 5–8; 22, pp. 14–15; 23, pp. 25–28; 24, p. 15; 26, pp. 25–111; 27, p. 37].

- **Air Migration Pathway** – Soil vapor intrusion (SVI) investigations have documented the contamination of subslab soil vapor and indoor air in several areas of the site. Some outdoor air samples collected concurrently with the indoor air samples have also shown CVOC concentrations that exceed background levels. Outdoor air samples are generally considered to represent background air conditions during an SVI investigation. It is not known if the groundwater contamination is the origin impacting the outdoor air quality, however, the site area is mostly covered by impermeable surfaces that might prevent contaminant migration from the subsurface contamination to the atmosphere [Ref. 6, p. 16; 16, p. 20; 17, p. 20; 18, p. 23; 25, p. 28; 26, p. 69; 28, pp. 68–69].

HRS DOCUMENTATION RECORD

Name of Site:	Meeker Avenue Plume	Date Prepared: September 2021
EPA Region:	2	
Street Address of Site*:	[Sidewalk at 856] Meeker Avenue	
City, County, State, Zip Code:	Brooklyn (Kings County), NY 11222	
General Location in the State:	New York City (southeastern portion of state)	
Topographic Map:	Brooklyn, NY	
Latitude*:	40° 43′ 31.4724” North (40.725409°)	
Longitude*:	-73° 56′ 09.2544″ West (-73.935904°)	
Site Reference Point:	Monitoring well DEC-124D, which is located approximately in the center of the extent of groundwater and soil vapor contamination	
References:	[**Figures 1 and 2**; Ref. 3, p. 1; 4, p. 1; 5, p. 2]	

* The street address, coordinates, and contaminant locations presented in this Hazard Ranking System (HRS) documentation record identify the general area where the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for National Priority List (NPL) listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

Scores

Ground Water[1] Pathway	Not Scored
Surface Water Pathway	Not Scored
Soil Exposure and Subsurface Intrusion Pathway	100.00
Air Pathway	Not Scored
HRS SITE SCORE	50.00

[1] “Ground water” and “groundwater” are synonymous; the spelling is different due to “ground water” being codified as part of the HRS, while “groundwater” is the modern spelling.

WORKSHEET FOR COMPUTING HRS SITE SCORE
Meeker Avenue Plume
Brooklyn, NY

	S	S^2
1. Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c. Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	
3a. Soil Exposure Component Score (S_{se}) (from Table 5-1, line 22)	Not Scored	
3b. Subsurface Intrusion Component Score (S_{ssi}) (from Table 5-11, line 12)	100.00	10,000
3c. Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi}) (from Table 5-11, line 13)	100.00	10,000
4. Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5. Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$	10,000	
6. **HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

HRS Table 5-11, Subsurface Intrusion Component Scoresheet
Meeker Avenue Plume
Brooklyn, NY

Factor Categories and Factors	Maximum Value	Value Assigned
Subsurface Intrusion Component		
Likelihood of Exposure:		
1. Observed Exposure	550	**550**
2. Potential for Exposure		
2a. Structure Containment	10	**Not Scored**
2b. Depth to contamination	10	**Not Scored**
2c. Vertical Migration	15	**Not Scored**
2d. Vapor Migration Potential	25	**Not Scored**
3. Potential for Exposure (lines 2a * (2b+2c+2d), subject to a maximum of 500)	500	**Not Scored**
4. Likelihood of Exposure (higher of lines 1 or 3)	550	**550**
Waste Characteristics:		
5. Toxicity/Degradation	(a)	**10,000**
6. Hazardous Waste Quantity	(a)	**10,000**
7. Waste Characteristics (subject to a maximum of 100)	100	**100**
Targets:		
8. Exposed Individual	50	**50**
9. Population:		
9a. Level I Concentrations	(b)	**303.1**
9b. Level II Concentrations	(b)	**192.5**
9c. Population within an Area of Subsurface Contamination	(b)	**Not Scored**
9d. Total Population (lines 9a + 9b + 9c)	(b)	**495.6**
10. Resources	5	**0**
11. Targets (lines 8 + 9d + 10)	(b)	**545.6**
Subsurface Intrusion Component Score		
12. Subsurface Intrusion Component (lines 4 x 7 x 11)/82,500[c] (subject to a maximum of 100)	100	**100.00**
Soil Exposure and Subsurface Intrusion Pathway Score		
13. Soil Exposure Component + Subsurface Intrusion Component (subject to a maximum of 100)	100	**100.00**

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to the nearest integer.

SCALE:

2,000 1,000 0 2,000

Graphic Scale In Feet

TITLE:

SITE LOCATION MAP
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY, NY

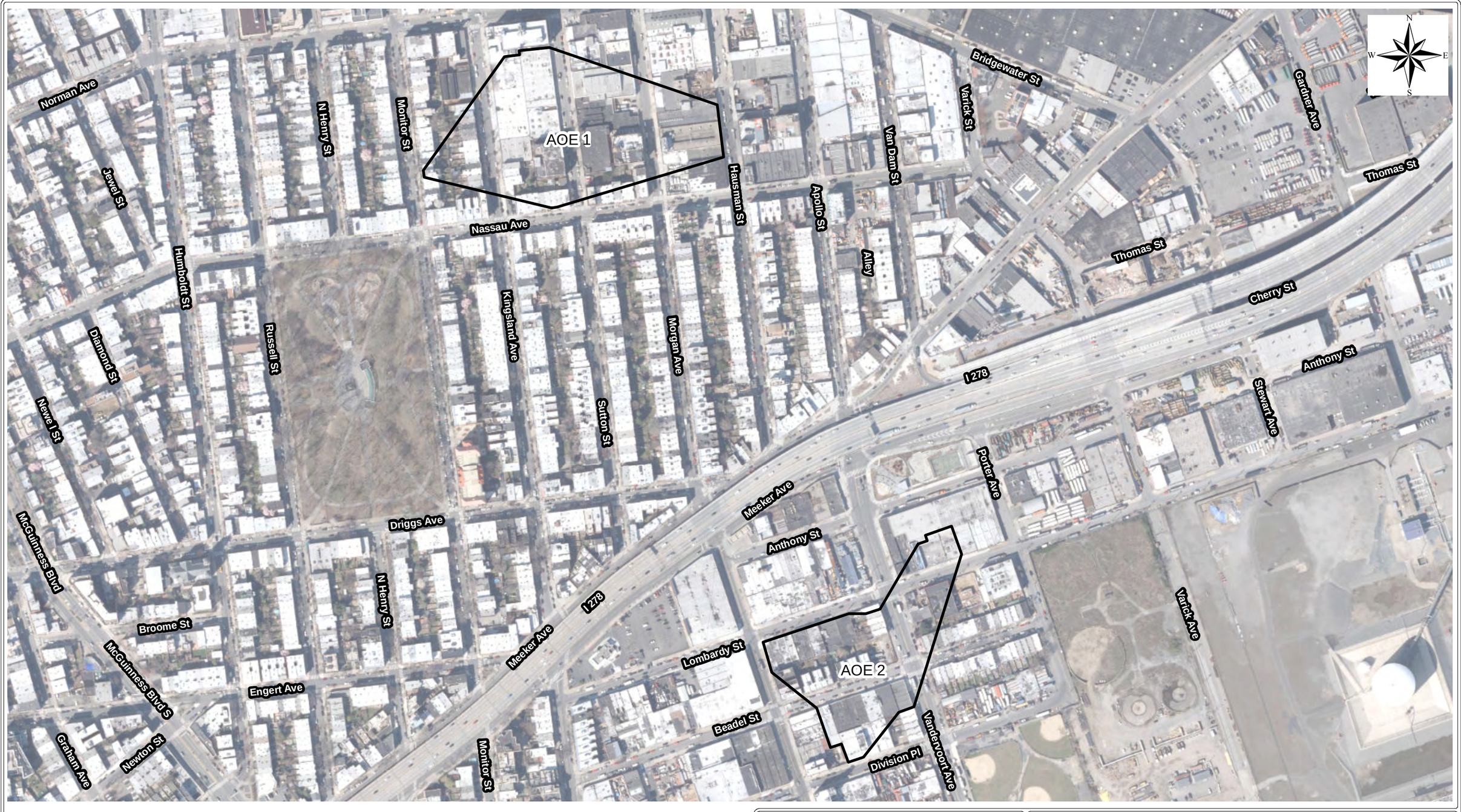
PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: July 2021

FIGURE #: 1



Legend

Area of Observed Exposure

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. See Figures 3 and 4.

SCALE: 300 150 0 300 Feet

TITLE: AREAS OF OBSERVED EXPOSURE
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

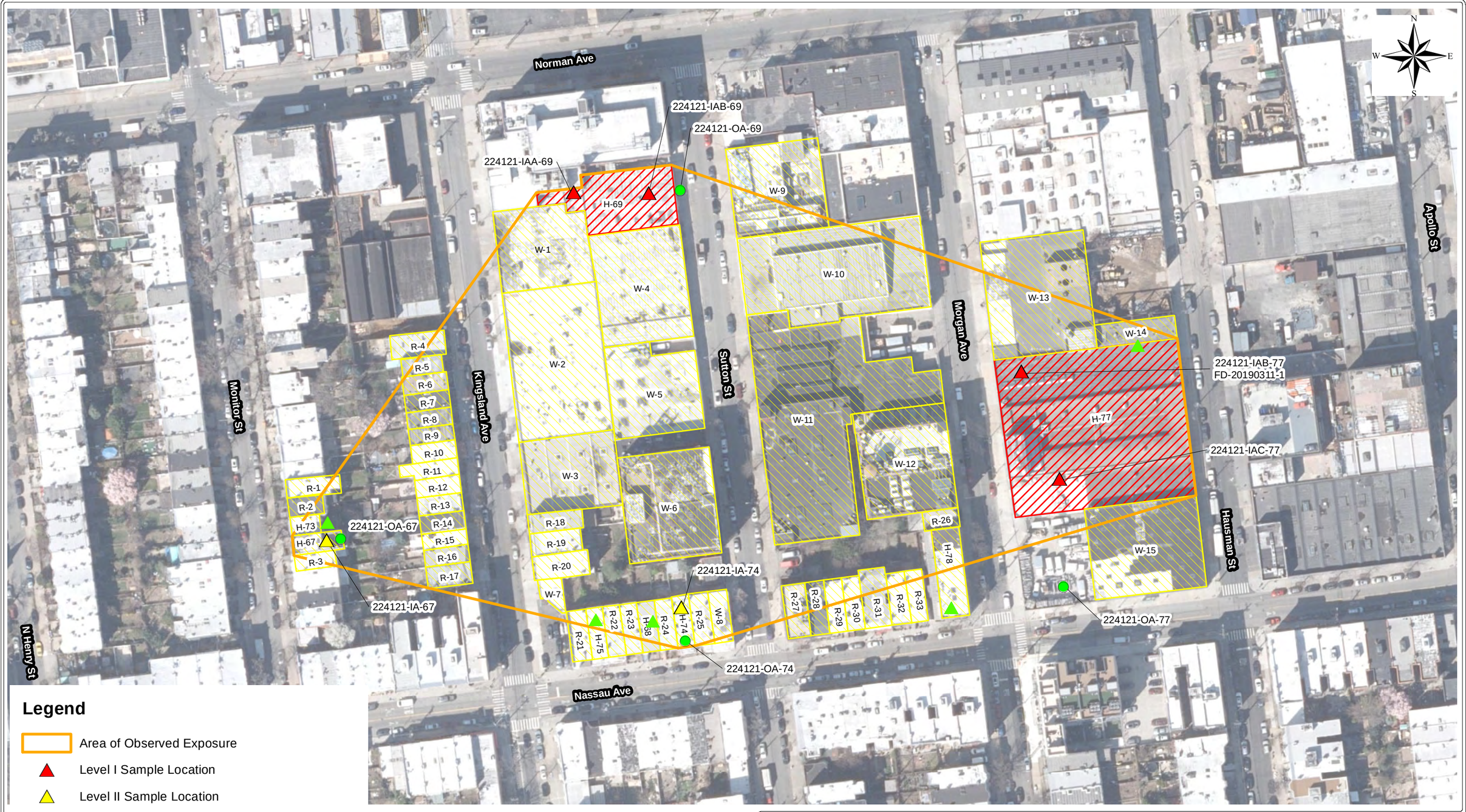
PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 2



Legend

- Area of Observed Exposure
- Level I Sample Location
- Level II Sample Location
- Indoor Air Sample Location not used in site scoring
- Outdoor Air Sample Location
- Level I Structure
- Level II Structure

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. Ref. 6, pp. 20, 79, 566, 568, 578, 582.

SCALE: 100 50 0 100 Feet

PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

TITLE: AREA OF OBSERVED EXPOSURE 1
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 3

Legend

- Outdoor Air Sample Location
- Level I Sample Location
- Level II Sample Locaiton
- Indoor Air Sample Location not used in site scoring
- Background Sample Location
- Area of Observed Exposure
- Level I Structure
- Level II Structure

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. Ref. 6, pp. 20, 79, 574, 578–579, 589, 591, 595.

SCALE: 100 50 0 100 Feet

PROJECT: Meeker Avenue Plume

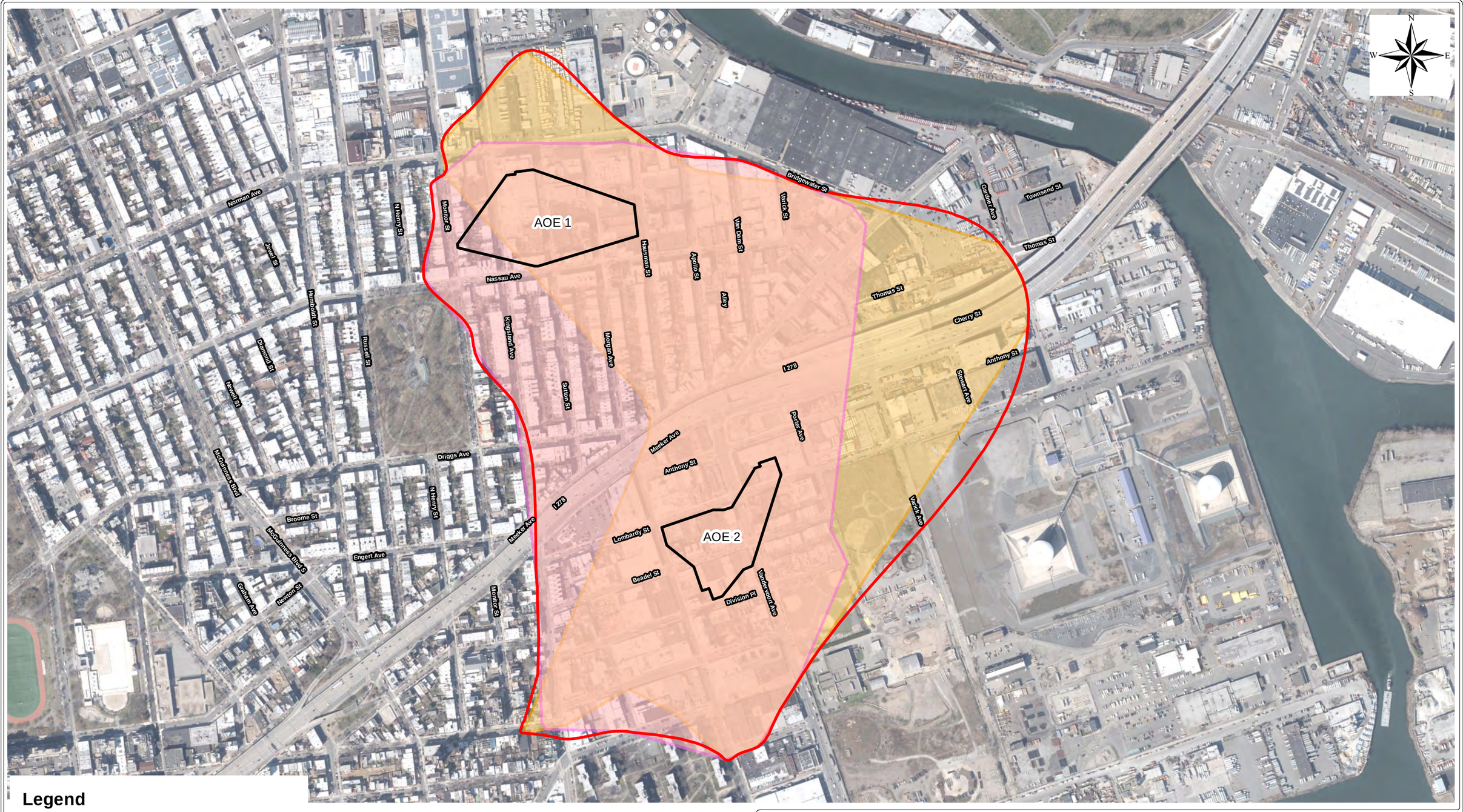
CLIENT NAME: EPA

TITLE: AREA OF OBSERVED EXPOSURE 2
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 4



Legend

- Extent of Subsurface Contamination
- Extent of Soil Gas Contamination
- Extent of Groundwater Contamination
- Area of Observed Exposure

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. See Figures 3, 4, 6, and 7.

SCALE: 500 250 0 500 Feet

PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

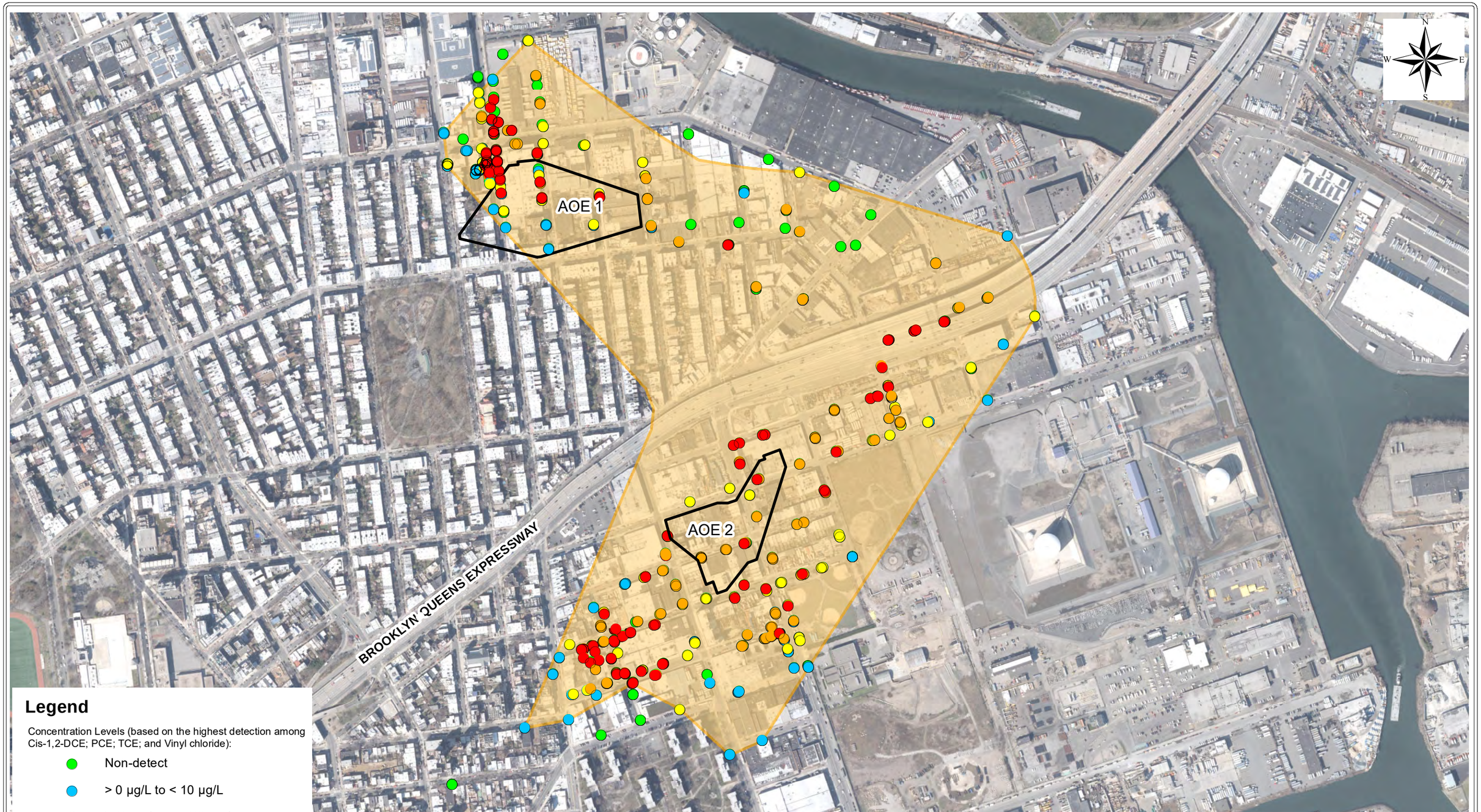
TITLE:

EXTENT OF SUBSURFACE CONTAMINATION
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 5



Legend

Concentration Levels (based on the highest detection among Cis-1,2-DCE; PCE; TCE; and Vinyl chloride):

- Non-detect
- > 0 µg/L to < 10 µg/L
- ≥ 10 µg/L to < 100 µg/L
- ≥ 100 µg/L to < 1,000 µg/L
- ≥ 1,000 µg/L

Area of Observed Exposure

Extent of Groundwater Contamination

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. Ref. 14, pp. 2–34, 87–90.
3. See Figures 3 and 4.

SCALE: 500 250 0 500 Feet

PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

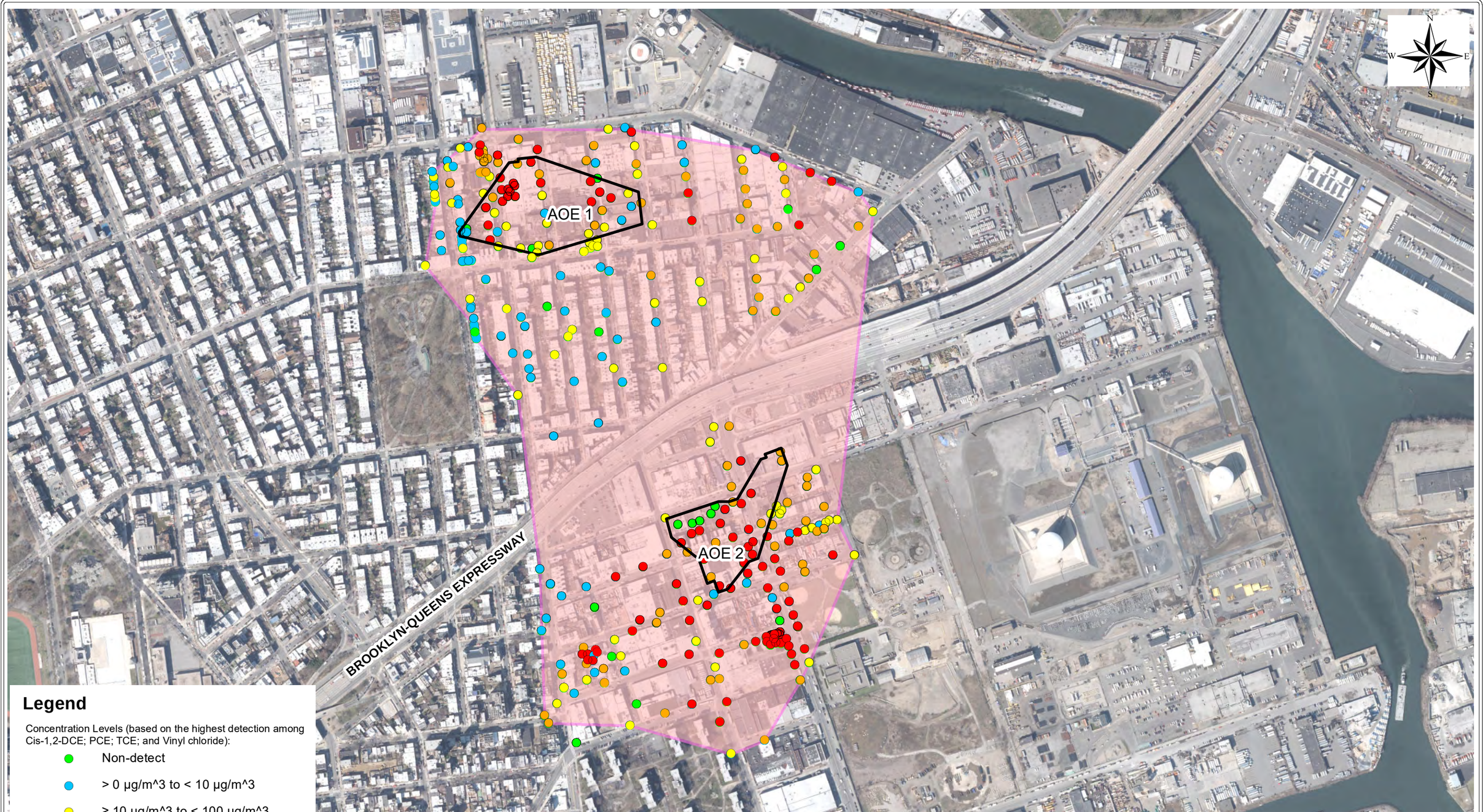
TITLE:

EXTENT OF GROUNDWATER CONTAMINATION
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 6



Legend

Concentration Levels (based on the highest detection among Cis-1,2-DCE; PCE; TCE; and Vinyl chloride):

- Non-detect
- > 0 µg/m^3 to < 10 µg/m^3
- ≥ 10 µg/m^3 to < 100 µg/m^3
- ≥ 100 µg/m^3 to < 1,000 µg/m^3
- ≥ 1,000 µg/m^3

Area of Observed Exposure

Extent of Soil Gas Contamination

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. Ref. 14, pp. 35–54, 91–94.
3. See Figures 3 and 4.

SCALE: 500 250 0 500 Feet

PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

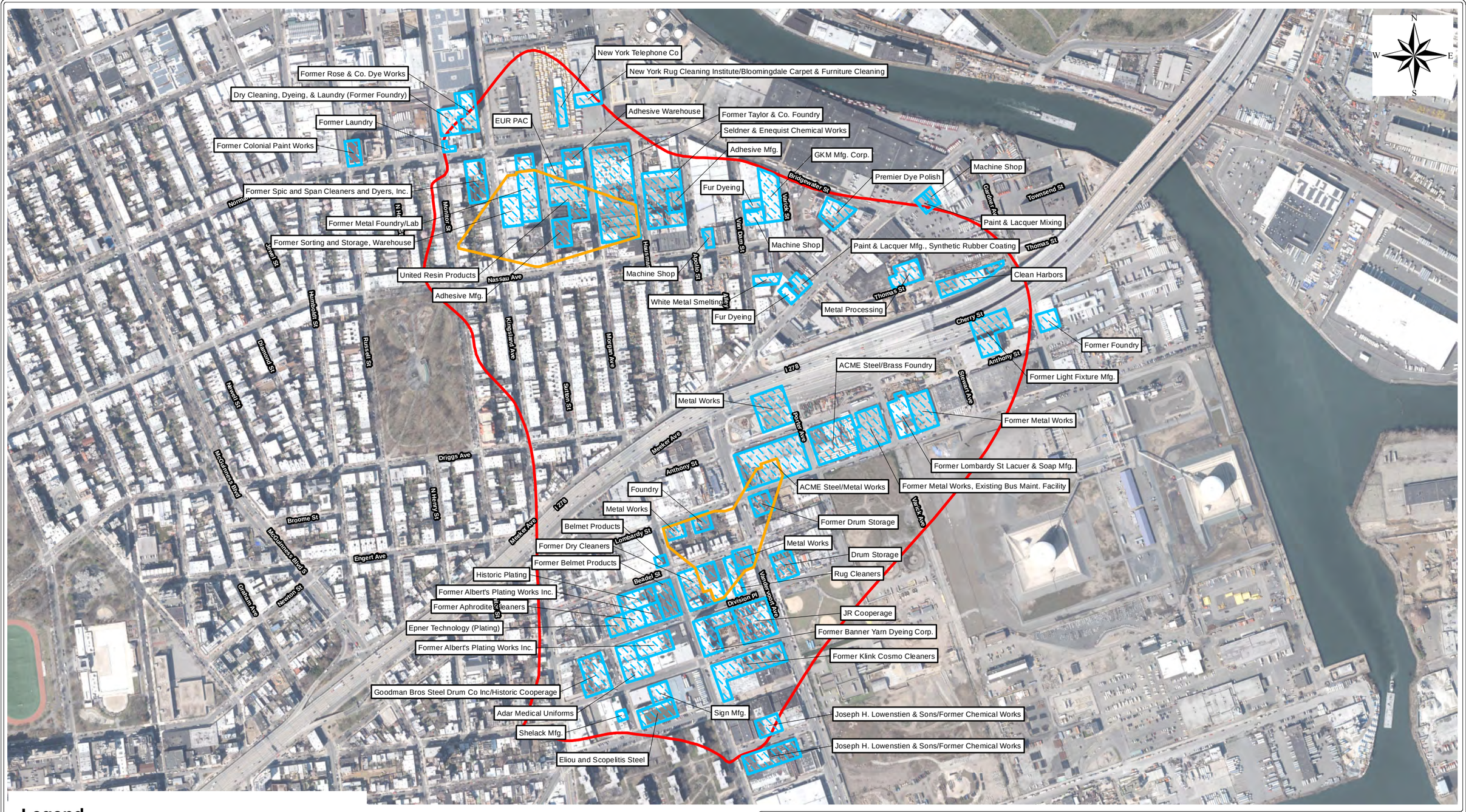
TITLE:

EXTENT OF SOIL GAS CONTAMINATION
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 7



Legend

- Area of Observed Exposure
- Known and Possible Originating Facilities of Subsurface CVOC Contamination
- Extent of Subsurface Contamination

Source:
1. *The source of this map image is Esri, used by EPA with Esri's permission.*
2. Ref. 22, p. 86; 26, p. 503.
3. See Figures 3 through 7.

SCALE: 500 250 0 500 Feet

PROJECT: Meeker Avenue Plume

CLIENT NAME: EPA

TITLE: POSSIBLE ORIGINS OF SUBSURFACE CVOC CONTAMINATION
MEEKER AVENUE PLUME
BROOKLYN, KINGS COUNTY NY

WESTON SOLUTIONS SM

DATE: July 2021

FIGURE #: 8

REFERENCES

Reference Number	Description of the Reference
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2.	EPA. Superfund Chemical Data Matrix (SCDM) Query: Factor Values and Benchmarks for Cis-1,2-Dichloroethylene, Tetrachloroethylene, Trichloroethylene, and Vinyl Chloride. Query accessed February 25, 2021. A complete copy of SCDM is available at http://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm. [8 pages]
3.	EPA. Superfund Site Information: Meeker Avenue Plume, EPA ID: NYN000203407. Accessed and downloaded at https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0203407 and https://cumulis.epa.gov/supercpad/cursites/calinfo.cfm?id=0203407 on April 2, 2020. [2 pages]
4.	U.S. Department of the Interior Geological Survey (USGS). Brooklyn Quadrangle, New York, 7.5-minute Series (Topographic). 2019. [1 map]
5.	New York State Department of Environmental Conservation (NYSDEC). State Superfund Program Fact Sheet, Site Name: Meeker Avenue Plume Trackdown, DEC Site #: 224121, Address: Meeker Avenue, Brooklyn, NY 11222. November 2016. [5 pages]
6.	URS Corporation (URS). Soil Vapor Intrusion Data Summary Report, Klink Cosmo and Spic & Span Area, March 2019, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. June 2019. [603 pages] [EPA has redacted personal identifiable information (PII) in this reference.]
7.	NYSDEC. Greenpoint Petroleum Remediation Project: Home, Project History, and Project Status. Available at http://nysdecgreenpoint.com/. Project Status last updated April 14, 2020. [8 pages]
8.	EPA Office of Chemical Safety and Pollution Prevention. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: Tetrachloroethylene (perchloroethylene), CASRN: 127-18-4. Support document for Docket EPA-HQ-OPPT-2016-0732. February 2017. [38 pages]
9.	EPA Office of Chemical Safety and Pollution Prevention. Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: Trichloroethylene, CASRN: 79-01-6. Support document for Docket EPA-HQ-OPPT-2016-0737. February 2017. [15 pages]
10.	Agency for Toxic Substances and Disease Registry (ATSDR), Division of Toxicology. Public Health Statement, 1,2-Dichloroethene CAS#: 540-59-0 (mixture), 156-59-2 (cis), 156-60-5 (trans). August 1996. [4 pages]
11.	ATSDR, Division of Toxicology and Environmental Medicine. Public Health Statement, Vinyl Chloride, CAS#: 75-01-4. July 2006. [7 pages]

REFERENCES (continued)

Reference Number	Description of the Reference
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14.	Gilliland, G., Weston Solutions, Inc. (WESTON®). Project Note to Meeker Avenue Plume HRS Site File, Subject: Existing Project Data – Meeker Avenue Plume; with attached data tables and maps. April 9, 2021. [100 pages]
15.	Roux Associates, Inc. (Roux). Soil Vapor Investigation Report, Greenpoint, Brooklyn, New York. Prepared for ExxonMobil Refining & Supply Company. October 2005. [125 pages]
16.	URS. [Confidential] Site Characterization, Soil Vapor Intrusion Data Summary Report, February-March 2008, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. June 2008. [344 pages] [EPA has redacted PII in this reference.]
17.	URS. Site Characterization, [Confidential Version] Soil Vapor Intrusion Data Summary Report, 2008/2009 Heating Season, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. July 2009. [1201 pages] [EPA has redacted PII in this reference.]
18.	URS. Site Characterization, [Confidential Version] Soil Vapor Intrusion Data Summary Report, 2009/2010 Heating Season, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. July 2010. [729 pages] [EPA has redacted PII in this reference.]
19.	URS. [Confidential Version] Soil Vapor Intrusion Data Summary Report, 2010/2011 Heating Season, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. July 2011. [367 pages] [EPA has redacted PII in this reference.]
20.	Driscoll, Denise, WESTON. Project Note to Meeker Avenue Plume Trackdown Site File, Subject: 4-Mile Distance Population Calculation. March 26, 2020. [1 page]
21.	Environmental Planning & Management, Inc. (EPM). Contaminated Material Investigation Findings Report, Kosciuszko Bridge Project, Kings & Queens Counties, New York, P.I.N. X729.77.123. Prepared for Parsons Corporation for submittal to New York State Department of Transportation (NYSDOT). July 2006. [397 pages]
22.	URS. Site Characterization, Phase I Data Summary Report, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. October 2007. [4482 pages]
23.	URS. Site Characterization, Phase IV Data Summary Report, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. May 2009. [1465 pages]

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Reference Number	Description of the Reference
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25.	URS. Expanded Outreach Area, Soil Vapor Intrusion Investigation, Phase IV Report, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. January 2015. [532 pages]
26.	URS. Site Characterization, Phase IX, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. December 2016. [2326 pages]
27.	URS. Site Characterization, Phase X, Meeker Avenue Plume Trackdown, Site No. 224121. Prepared for NYSDEC. July 2018. [1413 pages] [EPA has redacted PII in this reference.]
28.	URS. On-Site Phase III Remedial Investigation Report, Former Klink Cosmo Cleaners, Site No. 224130. Prepared for NYSDEC. March 2016. [1828 pages]
29.	Anchor QEA, LLC. Baseline Human Health Risk Assessment, Remedial Investigation/Feasibility Study, Newtown Creek. June 2017. [969 pages]
30.	Anchor QEA, LLC. Final Baseline Ecological Risk Assessment, Remedial Investigation/Feasibility Study, Newtown Creek. Prepared on behalf of NCG under CERCLA. October 2018. [828 pages]

SITE DESCRIPTION

The Meeker Avenue Plume site (EPA ID No. NYN000203407) in Brooklyn, NY, as scored for HRS purposes, consists of two areas of observed exposure (AOE) comprising 90 total structures that are delineated based on hazardous substances that have entered indoor air from subsurface contamination; the site-attributable hazardous substances detected in the AOEs include the following CVOCs: PCE, TCE, cis-1,2-DCE, and vinyl chloride [Ref. 3, p. 1; 5, pp. 1–3; 6, pp. 14–17; see **Table 2**; see **Section 5.2.0**]. The affected structures include 61 residential buildings (including one divided into two subunits) and 29 commercial buildings (including 3 divided into two subunits and one divided into three subunits) [see **Section 5.2.0**]. **Figure 1** presents a Site Location Map showing the AOEs and the approximate known extent of the subsurface CVOC contamination. **Figures 2 through 4** provide additional detail regarding the AOEs, and **Figures 5 through 7** provide additional detail regarding the subsurface CVOC contamination. **Figure 8** shows possible originating facilities of the subsurface CVOC contamination.

The site is in the Greenpoint/East Williamsburg area of Brooklyn, where it spans several city blocks as shown in **Figures 1 and 2** [Ref. 3, p. 1; 4, p. 1;]. The Brooklyn-Queens Expressway (BQE) roughly bisects the site in a west-southwest to east-northeast direction [Ref. 5, p. 5; 6, p. 57; see **Figure 2**]. Current land use within the site investigation area is a mixture of residential, commercial, and industrial [Ref. 6, p. 8; see **Table 2**]. The subsurface contamination associated with the site was discovered during investigation and remediation of an adjacent and overlapping petroleum groundwater contamination area, which had resulted from historical petroleum refining and storage operations along the banks of Newtown Creek [Ref. 6, pp. 6–7; 7, pp. 1–3]. Investigations since 1978 documented an estimated 17 million gallons of light nonaqueous phase liquid (LNAPL) petroleum in the subsurface across more than 52 acres; remediation efforts since 1990 have recovered more than 13 million gallons of the free-product petroleum and reduced the lateral extent of the petroleum contamination area [Ref. 6, pp. 6–7; 7, pp. 2–3, 6–7]. During several rounds of investigation, CVOCs including PCE and TCE were found in subsurface soil and groundwater outside the petroleum spill area [Ref. 6, p. 7]. Upon discovery of the CVOC contamination, NYSDEC initiated the Meeker Avenue Plume site investigation attempting to identify the possible origins of the CVOC contamination [Ref. 6, p. 7; 26, p. 25]. NYSDEC has conducted several subsurface and vapor intrusion investigations related to the site since 2007 [Ref. 6, pp. 7–13]. These investigations have consisted of soil, NAPL, groundwater, soil gas, outdoor (ambient) air, and indoor air sampling [Ref. 19, pp. 11–21; 26, pp. 28–111; 27, pp. 3–6]. The extent of NYSDEC's Meeker Avenue Plume Trackdown Investigation Area.is shown in **Figure 1**.

Groundwater sampling results for an extensive network of monitoring wells show the presence of subsurface CVOC contamination affecting the unsaturated zone and Upper Glacial aquifer throughout the site. Detections reported for groundwater samples collected from monitoring wells at the site have ranged from 0.3 µg/L to 99,000 µg/L for cis-1,2-DCE; 0.3 µg/L to 3,500,000 µg/L for PCE; 0.32 µg/L to 29,000 µg/L for TCE; and 0.57 µg/L to 14,000 µg/L for vinyl chloride [Ref. 14, pp. 2–34, 87–90]. Detections at or above 1,000 µg/L are widespread across the site, most frequently for PCE [Ref. 14, pp. 2–34]. **Figure 6** depicts the relative concentrations of the contaminants of concern for the most recent groundwater sampling event at each monitoring well. Detections in soil gas samples collected at the site have ranged from 0.28 micrograms per cubic meter (µg/m^3) to 5,600,000 µg/m^3 for cis-1,2-DCE; 0.37 µg/m^3 to 48,200,000 µg/ m^3 for PCE; 0.21 µg/m^3 to 2,800,000 µg/ m^3 for TCE; and 0.047 µg/m^3 to 150,000 µg/ m^3 for vinyl chloride [Ref. 14, pp. 35–54, 91–94]. **Figure 7** depicts the relative concentrations of the contaminants of concern for the most recent soil gas samples collected at each location. Some monitoring wells and soil gas samples on the periphery of the site do not show detections, indicating that the contaminants are not ubiquitous [see **Figures 6 and 7**].

Throughout the course of its investigations associated with the Meeker Avenue Plume site, NYSDEC has identified numerous possible origins of the subsurface CVOC contamination [Ref. 5, pp. 1–3; 6, pp. 7–8; 27, pp. 18–19, 42–51]. The site location has a long history of industrial activity—former or current industrial activities in the area that have been identified as possible origins of CVOC contamination include but are not limited to brass foundry operations; metal fabricating and metal plating operations; product manufacturing, including paints, lacquers, soaps, clothing, mattresses, and light fixtures; drum recycling; research laboratory operations; dyeing operations; and dry cleaning. Database searches and investigation results have indicated the presence of dozens of possible origins of contamination throughout the site, some of which have been investigated; however, the subsurface CVOC

contamination has not been definitively attributed to any single origin [Ref. 5, pp. 1–3; 6, pp. 7–8; 22, pp. 14–15; 23, pp. 25–28; 24, p. 15, 37-40; 26, pp. 25–111]. Additional possible originating facilities continue to be identified and investigated [Ref. 27, pp. 37, 51]. **Figure 8** shows the locations of possible originating facilities identified by NYSDEC, which are located at and between the AOE locations.

The levels of subsurface contamination fluctuate across the site. Elevated contaminant levels in both groundwater and soil gas are often found near possible originating facilities of the CVOC contamination; however, elevated levels are also found in areas where possible origins have not been identified [see **Figures 6, 7, and 8**]. In some areas, multiple origins are suspected of contributing to the subsurface contamination [Ref. 26, pp. 142]. NYSDEC has collected soil samples during soil boring and monitoring well installations, as well as at and in the vicinity of possible originating facilities [Ref. 6, pp. 5–6; 14, pp. 1, 38–51]. Some of the soil contamination is within 2 feet of the ground surface, however, most of the areas are covered by impermeable surfaces.

NYSDEC has conducted several rounds of investigation to evaluate and mitigate the impacts of vapor intrusion on residential and commercial buildings within the site investigation area. The investigations have included the collection of outdoor and indoor air samples in several areas throughout the site [Refs. 6, 16–17, and 35–38]. Occupied residential and commercial structures are affected by indoor air concentrations above the risk-based screening levels. The extent of groundwater, subsurface vapor, and soil contamination associated with the site, and subsequent impacts to indoor air, have not been fully delineated [Ref. 27, p. 51].

For the Meeker Avenue Plume site, EPA is evaluating the soil exposure and subsurface intrusion (SESsI) pathway—subsurface intrusion component. The results of the March 2019 SVI investigation document the presence of hazardous substances at levels that meet the criteria for observed exposure in the indoor air of several occupied structures. The data document Level I or Level II observed exposure to residents and workers in several structures, in addition to many other structures located within the AOEs inferred to be subject to Level II concentrations, totaling 90 affected regularly occupied structures. Older data not used in the HRS scoring evaluation indicates that the AOEs probably extend to numerous other occupied residential and commercial structures. The site as scored for HRS purposes includes two AOEs with documented subsurface intrusion of hazardous substances; this subsurface intrusion is the result of commingled subsurface contamination likely originating from many possible sources and that cannot be attributed to any single origin. As is shown in this HRS documentation record, the site qualifies for listing on the NPL based on the HRS score. AOE-specific scoresheets were also generated in evaluation of the site. These AOE-specific scoresheets in Appendices 1 and 2 of this HRS documentation record show that even if the AOEs were evaluated independently, they both score above 28.50 and qualify for the NPL.

5.0 SOIL EXPOSURE AND SUBSURFACE INTRUSION PATHWAY

The subsurface intrusion component is scored based on the actual intrusion of hazardous substances into regularly occupied structures that have structure containment values greater than zero and meet the criteria as being in an area of observed exposure [Ref. 1, Section 5.2.0].

5.2 SUBSURFACE INTRUSION COMPONENT

The subsurface intrusion component is evaluated because there are areas of observed exposure (AOE) within residences and workplaces [Ref. 1, Section 5.2.1]. The site includes two AOEs comprising 61 regularly occupied residential structures and 29 regularly occupied workplaces that meet the criteria for observed exposure or are inferred to be within the AOEs. The hazardous substances meeting observed exposure criteria in the AOEs (i.e., in the indoor air of regularly occupied structures) include cis-1,2-DCE, PCE, TCE, and vinyl chloride. The AOEs are delineated based on three residential structures and six workplaces with concentrations of these hazardous substances that meet observed exposure criteria, as documented through indoor air sampling (see **Observed Exposure by Chemical Analysis** in **Section 5.2.0**). Fifty-eight additional residential structures and twenty-three additional workplaces are inferred to be within the AOEs based on their location between the contaminated structures (see **Figures 3 and 4**) [Ref. 1, Section 5.2.0].

The origin of the indoor air contamination at the site is subsurface intrusion from an extensive groundwater and soil vapor contamination area that exists beneath the AOEs (see **Figures 1 and 5**). The hazardous substances detected most frequently and at the highest levels in the subsurface CVOC contamination area are cis-1,2-DCE, PCE, TCE, and vinyl chloride. The maximum concentrations reported in groundwater since 2017 are 3,500,000 µg/L for PCE; 61,000 µg/L for cis-1,2-DCE; 14,000 µg/L for vinyl chloride; and 10,000 µg/L for TCE. Other CVOCs detected less frequently in monitoring wells or subslab soil gas at the site include carbon tetrachloride; 1,1-DCA; 1,2-DCA; trans-1,2-DCE; methylene chloride; 1,1,1-TCA; and 1,1,2-TCA [Ref. 5, pp. 1–3; 6, pp. 7–8, 14–17; 14, pp. 2–34, 87–90]. The subsurface groundwater and soil vapor contamination is derived from a multitude of suspected and possible origins throughout the investigation area, and the extent is not fully delineated; all the structures in the AOEs are located above the CVOC subsurface contamination (see **Figure 1**). Subslab soil vapor samples collected concurrently with the indoor air samples showed that CVOCs are present in the subsurface directly beneath the AOEs, at levels up to 200,000 micrograms per cubic meter (µg/m^3) [Ref. 6, pp. 14–17, 79].

Based on borings performed at and near the Meeker Avenue Plume site by NYSDEC and other investigators, the site is underlain from the ground surface down by the Upper Glacial aquifer, the Raritan Formation, and crystalline bedrock. The primary hydrogeologic unit is the Upper Glacial aquifer, which consists of terminal moraine, ground moraine, and glacial outwash deposits and is characterized by USGS as an unsorted and unstratified mixture of clay, sand, gravel, and boulders. Textural units identified by NYSDEC in the Upper Glacial aquifer at the site include fill material, silty sand, sandy silt, sand, and localized clayey silt/silt. Based on slug test results from several Meeker Avenue Plume site monitoring wells, the hydraulic conductivity of the Upper Glacial aquifer ranges from 8.32×10^{-5} cm/s to 2.91×10^{-2} cm/s. At and near the site, the Upper Glacial aquifer is underlain by the Raritan Formation unit at an approximate depth of 101 to 138 ft bgs. The Raritan Formation, which consists of clay, silty clay, and clayey to silty fine sand, exhibits hydraulic conductivity less than 10^{-6} cm/s and is recognized as a confining unit. The water table surface occurs in the Upper Glacial aquifer from approximately 10 to 57 ft bgs. In general, groundwater flow in the aquifer is to the east and northeast. The water table in the northern and northeastern portions of the site is affected by the operation of the ExxonMobil Off-Site Recovery System since the mid-1990s, which has produced localized cones of depression around the recovery wells. Isolated/locally perched groundwater has been found in some portions of the site [Ref. 26, pp. 130–136, 178, 230, 426–454; 27, pp. 11–13, 184–192].

The CVOC contamination is encountered in both shallow and deep glacial deposits, indicating that it affects the full thickness of the Upper Glacial aquifer at the site. DNAPL has been encountered and sampled within the contamination area, as evidenced by the PCE concentrations up to 3,500,000 µg/L [Ref. 5, pp. 1–3; 6, pp. 6–8; 14, pp. 2–34; 26, pp. 28–111, 177–181; 27, pp. 11–12, 15–20]. The shallow unconsolidated materials encountered at

the site consist of sand and clayey silt/sand with a mean hydraulic conductivity of 8.03×10^{-3} cm/s, and sandy silt with a mean hydraulic conductivity of 3.15×10^{-4} cm/s [Ref. 26, pp. 136, 230].

The widely-used volatile compounds PCE and TCE, and their breakdown products cis-1,2-DCE and vinyl chloride, are part of a common class of chemicals with known vapor intrusion characteristics [Ref. 6, p. 7; 8, pp. 5–32; 9, pp. 5–10; 10, p. 2; 11, pp. 1–2]. The subsurface vapors emanate from the contaminated groundwater and enter the pore space around and between the subsurface soil particles and soil column above the groundwater table. From there the hazardous vapors in the vadose zone (the soil between the surface and the groundwater table) have entered buildings by migrating through cracks, seams, interstices, and gaps in walls or foundations.

During its investigations of the site, NYSDEC has identified numerous historical and current possible origins of contamination. The site location has a long history of industrial activity—former or current industrial activities in the area that have been identified as possible origins of CVOC contamination include but are not limited to brass foundry operations; metal fabricating and metal plating operations; product manufacturing, including paints, lacquers, soaps, clothing, mattresses, and light fixtures; drum recycling; research laboratory operations; dyeing operations; and dry cleaning. Database searches and investigation results have indicated the presence of dozens of possible origins of contamination throughout the site investigation area, some of which have been investigated; however, the CVOC groundwater contamination has not been definitively attributed to any single origin [Ref. 5, pp. 1–3; 6, pp. 7–8; 22, pp. 14–15; 23, pp. 25–28; 24, p. 15; 26, pp. 25–111].

Current land use within the site investigation area is a mixture of residential and manufacturing, including both commercial and industrial facilities [Ref. 5, pp. 2, 5; 6, pp. 7–8, 57]. The total population within 4 miles of the approximate center of the groundwater contamination area exceeds 2.2 million people [Ref. 20, p. 1].

5.2.0 GENERAL CONSIDERATIONS

There are two identified areas of observed exposure (AOE) at the site where structures are subject to indoor air contamination due to subsurface intrusion, as shown in **Figures 3 and 4**.

TABLE 1. SUMMARY OF STRUCTURES WITHIN AREAS OF OBSERVED EXPOSURE

AOE Number	Type of Structure	Number(s) of Specific Type of Structure [1]	References
AOE 1	Residence Workplace	39 17	Figure 3
AOE 2	Residence Workplace	22 12	Figure 4

[1] For multi-subunit structures, the actual number of regularly occupied subunits subject to exposure is included in the structure counts. Although most of the residential structures sampled during the March 2019 sampling event were multifamily homes, multiple subunits on the sampled level (i.e., the lowest level) were identified in only one residential structure, identified as H-67 [Ref. 6, pp. 20, 129–134]. Multiple subunits were not reported on the sampled level for any other residential structures; however, four one-story commercial/industrial structures (H-70, H-77, H-80, and H-82) are divided into subunits because separate partitioned areas of each of these structures seem likely to be subject to distinctly different air exchange rates [Ref. 1, Section 5.2.0; 6, pp. 20, 137–142, 145–150, 158–163, 166–171, 174–179, 182–187, 190–195, 198–203, 206–211, 214–219, 222–227, 230–235, 238–243, 246–251, 254–259]. For all structures within the inferred areas of observed exposure, where the divisions are unknown, a default value of one regularly occupied subunit on the lowest level is used for HRS scoring purposes.

In addition to the scored AOEs listed above, historical investigations and data indicate that additional regularly occupied structures above the documented subsurface contamination at the site, including structures between AOE 1 and AOE 2, are also subject to Level I or Level II indoor air concentrations due to subsurface intrusion [Ref. 14, pp. 78–84, 86–100]. The investigations have included the collection of subslab soil vapor, indoor air, and outdoor air samples in several areas. In February-March 2008, March 2009, March 2010, and February-March 2011, NYSDEC conducted SVI investigations, including indoor air sampling at residential and commercial/residential structures. PCE, TCE, cis-1,2-DCE, and vinyl chloride were detected in both subslab soil vapor and indoor air samples collected at several structures. Based on the SVI sampling results showing elevated concentrations of CVOCs, recommended actions included “Mitigate” (i.e., install SSD systems), “Monitor/Mitigate”, “Monitor”, “Take reasonable and practical actions to identify source(s) and reduce exposures”, and “Identify Source(s) and Resample or Mitigate”. The structures that showed indoor air contamination due to subsurface intrusion are located primarily in three areas: the inferred portions of the site AOEs; the immediate vicinity of the site AOEs; and an area south of AOE 1 and north-northwest of AOE 2 [Ref. 6, pp. 9–20, 22–55, 60–79; 16, pp. 12–19, 24–39; 17, pp. 10–22, 27–44, 114–118; 18, pp. 14–26, 31, 111–139, 155–158; 19, pp. 16–25, 29, 139–146, 166–169]. However, for the purpose of HRS scoring, only the March 2019 data has been used in this HRS documentation record.

Area(s) of Observed Exposure

The results of the March 2019 sampling event document two areas where regularly occupied structures are subject to Level I or Level II indoor air concentrations due to subsurface intrusion; these areas are presented as AOE 1 and AOE 2 (see **Figures 2, 3, and 4**).

AOE 1 – Area of Observed Exposure 1 and AOE 2 – Area of Observed Exposure 2

Location, description, and delineation of the AOEs (with reference to a map of the site):

There are 39 regularly occupied residential structures and 17 regularly occupied workplaces within AOE 1. The AOE is delineated based on two residential structures and two workplace structures that had observed exposures of site-attributable hazardous substances, as documented through indoor air sampling (see **Observed Exposure by Chemical Analysis** below). Thirty-seven additional residential structures and 15 additional workplaces are inferred

to be within AOE 1 based on their location between the structures that meet the observed exposure criteria through chemical analysis (see **Figure 3**) [Ref. 1, Section 5.2.0].

There are 22 regularly occupied residential structures and 12 regularly occupied workplaces within AOE 2. The AOE is delineated based on one residential structure and four workplace structures that had observed exposure concentrations of site-attributable hazardous substances, as documented through indoor air sampling (see **Observed Exposure by Chemical Analysis** below). Twenty-one additional residential structures and 8 additional workplaces are inferred to be within AOE 2 based on their location between the structures that meet the observed exposure criteria through chemical analysis (see **Figure 4**) [Ref. 1, Section 5.2.0].

All the structures in AOE 1 and AOE 2 are located above the CVOC subsurface contamination discussed in this HRS documentation record (see **Figures 1 and 5**).

Identification of all regularly occupied structures in the AOEs:

TABLE 2. REGULARLY OCCUPIED STRUCTURES WITHIN THE AOEs

Type of Structure [(1)]	Regularly Occupied Structure ID [(2)]	References
AOE 1		
Residence (sample location)	H-67-1	Ref. 6, pp. 20, 60, 129–136, 265, 302
Residence (subunit, same level as H-67-1) (inferred AOE)	H-67-2	Ref. 6, pp. 20, 60, 129–136, 265, 302
Workplace (sample location)	H-69	Ref. 6, pp. 20, 60, 145–155, 268, 304
Residence (sample location)	H-74	Ref. 6, pp. 20, 60, 190–197, 277, 310
Workplace (sample location)	H-77-1 (office/display rooms)	Ref. 6, pp. 20, 60, 214–221, 282, 313–314
Workplace (subunit, same level as H-77-1) (inferred AOE)	H-77-2 (warehouse)	Ref. 6, pp. 20, 60, 214–221, 282, 313–314
Workplace (subunit, same level as H-77-1) (inferred AOE)	H-77-3 (stone cutting room)	Ref. 6, pp. 20, 60, 214–221, 282, 313–314
Residence (inferred AOE)	H-68	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	H-73	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	H-75	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	H-78	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-1	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-2	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-3	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-4	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-5	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-6	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-7	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-8	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-9	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-10	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-11	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-12	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-13	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-14	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-15	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-16	Figure 3; Ref. 1, Section 5.2.0

TABLE 2. REGULARLY OCCUPIED STRUCTURES WITHIN THE AOEs		
Type of Structure [(1)]	**Regularly Occupied Structure ID** [(2)]	**References**
Residence (inferred AOE)	R-17	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-18	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-19	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-20	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-21	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-22	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-23	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-24	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-25	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-26	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-27	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-28	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-29	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-30	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-31	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-32	Figure 3; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-33	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-1	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-2	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-3	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-4	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-5	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-6	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-7	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-8	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-9	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-10	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-11	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-12	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-13	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-14	Figure 3; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-15	Figure 3; Ref. 1, Section 5.2.0
AOE 2		
Workplace (sample location)	H-70-1 (manufacturing area)	Ref. 6, pp. 20, 60, 158–165, 270, 271, 305
Workplace (sample location)	H-70-2 (office area)	Ref. 6, pp. 20, 60, 158–165, 270, 271, 305
Residence (sample location)	H-71	Ref. 6, pp. 20, 60, 166–173, 273, 307
Workplace (sample location)	H-79	Ref. 6, pp. 20, 60, 230–237, 287, 288, 316, 317
Workplace (sample location)	H-80-1 (office/showroom area)	Ref. 6, pp. 20, 60, 238–245, 290–291, 318, 319
Workplace (sample location)	H-80-2 (warehouse/shop area)	Ref. 6, pp. 20, 60, 238–245, 290–291, 318, 319
Workplace (sample location)	H-82-1 (shop areas)	Ref. 6, pp. 20, 60, 254–261, 295–300, 321–323
Workplace (subunit, same level as H-82-1) (inferred AOE)	H-82-2 (office area)	Ref. 6, pp. 20, 60, 254–261, 295–300, 321–323

TABLE 2. REGULARLY OCCUPIED STRUCTURES WITHIN THE AOEs		
Type of Structure [(1)]	**Regularly Occupied Structure ID [(2)]**	**References**
Residence (inferred AOE)	H-81	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-34	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-35	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-36	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-37	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-38	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-39	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-40	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-41	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-42	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-43	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-44	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-45	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-46	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-47	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-48	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-49	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-50	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-51	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-52	Figure 4; Ref. 1, Section 5.2.0
Residence (inferred AOE)	R-53	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-16	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-17	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-18	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-19	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-20	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-21	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-22	Figure 4; Ref. 1, Section 5.2.0
Workplace (inferred AOE)	W-23	Figure 4; Ref. 1, Section 5.2.0

[(1)] Based on information gathered via community outreach efforts by NYSDEC for the March 2019 sampling investigation, the regularly occupied residential buildings within the AOEs are a combination of single-subunit and multi-subunit structures. Most of the multi-subunit residential structures are stacked due to the relatively small footprints of the buildings. The commercial workplaces include single-subunit and multi-subunit manufacturing facilities (e.g., cut stone products), as well as single-subunit retail facilities (e.g., coffee shop in W-8) [Ref. 6, pp. 82–101].

[(2)] A distinct ID for each subunit evaluated is provided where applicable. Multiple residential subunits on the level subject to exposure are identified only in the structure identified as H-67 during the March 2019 sampling event. Multiple subunits are also identified in four single-story workplaces (H-70, H-77, H-80, and H-82), where separate partitioned areas of the structure seem likely to be subject to different air exchange rates (see **Table 1** above). The subunits in these structures are assigned structure IDs with sequential suffixes (i.e., -1, -2, etc.) for the purposes of this evaluation.

Observed Exposure by Direct Observation

Observed exposure by direct observation is not evaluated.

Observed Exposure by Chemical Analysis

Multiple residences and workplaces at this site have been identified as having indoor air concentrations for CVOCs that meet observed exposure criteria, as documented below. NYSDEC performed indoor air sampling and

associated outdoor air sampling in March 2019; the results for three residences and six workplaces document areas of observed exposure. Of those, one residence and four workplaces exhibited concentrations above HRS subsurface intrusion component benchmarks [Ref. 2, pp. 3, 5, 7; 6, pp. 327–330, 392, 405, 408, 417, 419, 421, 430, 446, 466, 468, 470, 491–492, 494, 496, 509, 511, 513, 516, 532, 536, 566, 568, 574, 578, 582, 589, 591, 595].

Establishment of Background Levels

During the March 2019 SVI sampling event, NYSDEC collected indoor air samples from two structures near the eastern extent of the subsurface CVOC contamination; the results for these samples show the absence of indoor air CVOC contamination and are used to establish background levels as presented below. The background sample locations are shown in **Figure 4**.

All background and observed exposure indoor air samples were collected during the same timeframe (i.e., March 2019). The samples were collected using laboratory evacuated 6-liter canisters with either 24-hour or 8-hour laboratory calibrated flow regulators (24-hour regulators were calibrated at the flow rate of approximately 0.004 liters per minute [L/min] and were used for residential buildings; 8-hour regulators were calibrated at the flow rate of approximately 0.012 L/min and were used for commercial buildings. All samples were delivered under chain-of-custody to TestAmerica Laboratory in Knoxville, Tennessee, a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program-certified laboratory, where they were analyzed for volatile organic compounds (VOC) by EPA Method TO-15 [Ref. 6, pp. 11–13, 302, 304, 305, 307, 308, 310, 312–314, 316–319, 321, 566, 568, 574, 578, 579, 582, 589, 591, 595]. Data validation shows that all results are fully usable without qualification [Ref. 6, pp. 327–330].

TABLE 3. AOE 1 / AOE 2 BACKGROUND LOCATIONS

Sample ID	Sample Location/Regularly Occupied Structure ID	Start Date and Time	End Date and Time	Basis for Sample as Background	References
224121-IA-72	H-72	03/09/19 1011	03/10/19 0909	Residence at edge of impacted area; occupied basement	Ref. 6, pp. 20, 60, 174–181, 275, 308, 578
224121-IA-76	H-76	03/09/19 1731	03/10/19 1605	Residence at edge of impacted area; occupied basement	Ref. 6, pp. 20, 60, 206–213, 280, 312, 579

TABLE 4. AOE 1 / AOE 2 BACKGROUND SAMPLE CONCENTRATIONS

Sample ID	Eligible Hazardous Substance	Concentration (µg/m^3)	Reporting Limit (µg/m^3) [(1)]	References
224121-IA-72	Cis-1,2-DCE	0.16 U	0.16	Ref. 6, pp. 327–330, 435, 578
	PCE	0.54 U	0.54	Ref. 6, pp. 327–330, 436, 578
	TCE	0.19 U	0.19	Ref. 6, pp. 327–330, 436, 578
	Vinyl chloride	0.10 U	0.10	Ref. 6, pp. 327–330, 436, 578
224121-IA-76	Cis-1,2-DCE	0.16 U	0.16	Ref. 6, pp. 327–330, 456, 579
	PCE	0.54 U	0.54	Ref. 6, pp. 327–330, 457, 579
	TCE	0.19 U	0.19	Ref. 6, pp. 327–330, 457, 579
	Vinyl chloride	0.10 U	0.10	Ref. 6, pp. 327–330, 457, 579

U – The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit (SQL) [Ref. 6, p. 330].

[(1)] The reporting limits (RL), also referred to as reported SQLs, were reported in accordance with method requirements; they represent the lowest achievable reporting limits at the dilutions utilized in the analyses [Ref. 6, pp. 329–330, 435–436, 456–457, 579]. This is equivalent to the HRS definition of SQL (i.e., the quantity of a hazardous substance that can be reasonably

quantified given the limits of detection for the method of analysis and sample characteristics that may affect quantitation [e.g., dilution, concentration) [Ref. 1, Section 1.1].

Background Levels

The maximum background RLs for cis-1,2-DCE (0.16 µg/m^3); PCE (0.54 µg/m^3); TCE (0.19 µg/m^3); and vinyl chloride (0.10 µg/m^3) are selected as the background levels for establishing observed exposure because all background results for the four hazardous substances were non-detect [Ref. 1, Sections 2.3 and 5.2.1.1.1]. Prior to sampling, NYSDEC completed an inventory of chemicals found in each structure and screened indoor air with a part-per-billion (ppb)-range photoionization detector (PID) for possible origins of VOCs within each structure. Occupants of all structures were instructed to avoid activities that might interfere with the results prior to and during the air sampling [Ref. 6, pp. 11, 136, 144, 152–155, 165, 173, 181, 189, 197, 205, 213, 221, 229, 237, 245, 253, 261, 263].

TABLE 5. AOE 1 / AOE 2 BACKGROUND LEVELS

Eligible Hazardous Substance	Background Level (µg/m^3)	Concentrations used for Establishing an Observed Exposure (µg/m^3)
Cis-1,2-DCE	0.16 U	≥ 0.16
PCE	0.54 U	≥ 0.54
TCE	0.19 U	≥ 0.19
Vinyl chloride	0.10 U	≥ 0.10

U – The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit [Ref. 6, p. 330].

Historical background levels at the site from previous sampling events provide additional support for the background levels selected. Three indoor air samples collected in March 2009 from locations H-01-09, H-03-09, and H-04-09 near the western edge of the subsurface contamination showed non-detect results for cis-1,2-DCE at RLs of 0.16 µg/m^3; PCE at RLs of 0.28 µg/m^3; TCE at RLs of 0.22 µg/m^3; and vinyl chloride at RLs of 0.11 µg/m^3 [Ref. 17, pp. 112, 115, 125–134, 145–164, 580, 583, 585, 665, 667, 668, 729–732, 796, 806, 812, 1082, 1089]. One indoor air sample collected in March 2010 from location H-49 near the western edge of the subsurface contamination showed non-detect results for cis-1,2-DCE at an RL of 0.14 µg/m^3; PCE at an RL of 0.24 µg/m^3; TCE at an SQL of 0.19 µg/m^3; and vinyl chloride at an RL of 0.09 µg/m^3 [Ref. 18, pp. 148, 155, 277–286, 463, 500–501, 576–577, 670].

Exposure Samples

Indoor air concentrations of cis-1,2-DCE; PCE; TCE; and vinyl chloride greater than or equal to their respective site-specific background levels and attributable to the subsurface contamination are used to establish observed exposure [Ref. 1, Table 2-3]. Results for indoor air samples collected from nine structures exhibited concentrations that exceed these site-specific background levels, as shown below.

TABLE 6. AOE 1 / AOE 2 OBSERVED EXPOSURE SAMPLE LOCATIONS

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
AOE 1					
H-67-1	224121-IA-67	bedroom area in basement	03/02/19 0915	03/03/19 0835	Ref. 6, pp. 20, 60, 129–136, 265, 302, 566
H-69	224121-IAA-69	rear area of shop	03/07/19 0908	03/07/19 1652	Ref. 6, pp. 20, 60, 145–155, 268, 304, 568
	224121-IAB-69	front area of shop	03/07/19 0911	03/07/19 1653	Ref. 6, pp. 20, 60, 145–155, 268, 304, 568

TABLE 6. AOE 1 / AOE 2 OBSERVED EXPOSURE SAMPLE LOCATIONS					
Regularly Occupied Structure ID	**Sample ID**	**Sample Location**	**Start Date and Time**	**End Date and Time**	**References**
H-74	224121-IA-74	basement room	03/09/19 1408	03/10/19 1238	Ref. 6, pp. 20, 60, 190–197, 277, 310, 578
H-77-1	224121-IAB-77	rear area of showroom	03/11/19 1027	03/11/19 1757	Ref. 6, pp. 20, 60, 214–221, 282, 313–314, 582
	FD-20190311-1[(1)]	rear area of showroom	03/11/19 1027	03/11/19 1757	Ref. 6, pp. 20, 60, 214–221, 282, 313–314, 582
	224121-IAC-77	front room offices	03/11/19 1030	03/11/19 1800	Ref. 6, pp. 20, 60, 214–221, 282, 314, 582
AOE 2					
H-70-1	224121-IAA-70	rear area of shop	03/08/19 0831	03/08/19 1440	Ref. 6, pp. 20, 60, 158–165, 270, 305, 574
	224121-IAB-70	front area of shop	03/08/19 0832	03/08/19 1435	Ref. 6, pp. 20, 60, 158–165, 271, 305, 574
H-70-2	224121-IAC-70	office space	03/08/19 0834	03/08/19 1437	Ref. 6, pp. 20, 60, 158–165, 271, 305, 574
H-71	224121-IA-71	playroom area in basement	03/09/19 0811	03/10/19 0711	Ref. 6, pp. 20, 60, 166–173, 273, 307, 578
H-79	224121-IAA-79	rear area of shop	03/12/19 0932	03/12/19 1632	Ref. 6, pp. 20, 60, 230–237, 287, 316, 589
	224121-IAB-79	middle area of shop	03/12/19 0928	03/12/19 1636	Ref. 6, pp. 20, 60, 230–237, 287, 316, 589
	224121-IAC-79	front office	03/12/19 0930	03/12/19 1641	Ref. 6, pp. 20, 60, 230–237, 288, 317, 589
H-80-1	224121-IAA-80	showroom	03/13/19 0911	03/13/19 1651	Ref. 6, pp. 20, 60, 238–245, 290, 318, 591
	224121-IAB-80	conference room	03/13/19 0913	03/13/19 1653	Ref. 6, pp. 20, 60, 238–245, 291, 318, 591
	FD-20190313-2[(2)]	conference room	03/13/19 0913	03/13/19 1653	Ref. 6, pp. 20, 60, 238–245, 291, 319, 591
H-80-2	224121-IAC-80	warehouse breakroom	03/13/19 0920	03/13/19 1656	Ref. 6, pp. 20, 60, 238–245, 291, 319, 591
H-82-1	224121-IAA-82	work room	03/20/19 1025	03/20/19 1750	Ref. 6, pp. 20, 60, 254–261, 295, 321, 595
	224121-IAB-82	work room	03/20/19 1040	03/20/19 1740	Ref. 6, pp. 20, 60, 254–261, 295, 321, 595

[(1)] The sample is a field duplicate of sample 224121-IAB-77 [Ref. 6, p. 328].
[(2)] The sample is a field duplicate of sample 224121-IAB-80 [Ref. 6, p. 329].

TABLE 7. AOE 1 / AOE 2 OBSERVED EXPOSURE SAMPLE CONCENTRATIONS				
Sample ID	**Eligible Hazardous Substance**	**Concentration (µg/m^3)**	**Reporting Limit (µg/m^3) [(1)]**	**References**
AOE 1				
224121-IA-67	PCE	1.3	0.54	Ref. 6, pp. 327–330, 392, 566
224121-IAA-69	PCE	7.6	0.54	Ref. 6, pp. 327–330, 405, 568
	TCE	2.4	0.19	
224121-IAB-69	PCE	10	0.54	Ref. 6, pp. 327–330, 408, 568
	TCE	3.1	0.19	
224121-IA-74	PCE	1.1	0.54	Ref. 6, pp. 327–330, 446, 578

TABLE 7. AOE 1 / AOE 2 OBSERVED EXPOSURE SAMPLE CONCENTRATIONS				
Sample ID	**Eligible Hazardous Substance**	**Concentration ($\mu g/m^3$)**	**Reporting Limit ($\mu g/m^3$) (1)**	**References**
224121-IAB-77	TCE	1.4	0.97	Ref. 6, pp. 327–330, 466, 582
FD-20190311-1(2)	TCE	1.5	0.97	Ref. 6, pp. 327–330, 468, 582
224121-IAC-77	PCE	1.5	0.54	Ref. 6, pp. 327–330, 470, 582
	TCE	1.1	0.19	
AOE 2				
224121-IAA-70	PCE	4.4	0.54	Ref. 6, pp. 327–330, 417, 574
224121-IAB-70	PCE	4.8	0.56	Ref. 6, pp. 327–330, 419, 574
224121-IAC-70	PCE	6.2	0.54	Ref. 6, pp. 327–330, 421, 574
224121-IA-71	PCE	2.5	0.54	Ref. 6, pp. 327–330, 430, 578
	TCE	0.81	0.19	
	Vinyl chloride	0.27	0.10	
224121-IAA-79	Cis-1,2-DCE	0.16	0.16	Ref. 6, pp. 327–330, 491–492, 589
	PCE	46	0.54	
	TCE	0.54	0.19	
224121-IAB-79	PCE	16	0.54	Ref. 6, pp. 327–330, 494, 589
	TCE	0.27	0.19	
224121-IAC-79	PCE	34	0.54	Ref. 6, pp. 327–330, 496, 589
	TCE	0.79	0.19	
224121-IAA-80	PCE	4.6	2.7	Ref. 6, pp. 327–330, 509, 591
224121-IAB-80	PCE	6.5	2.7	Ref. 6, pp. 327–330, 511, 591
FD-20190313-2(3)	PCE	6.8	0.54	Ref. 6, pp. 327–330, 513, 591
	TCE	0.49	0.19	
224121-IAC-80	PCE	140	2.7	Ref. 6, pp. 327–330, 516, 591
224121-IAA-82	PCE	8.3	2.7	Ref. 6, pp. 327–330, 532, 595
224121-IAB-82	PCE	5.5	2.8	Ref. 6, pp. 327–330, 536, 595

(1) The reporting limits (RL), also referred to as reported SQLs, were reported in accordance with method requirements; they represent the lowest achievable reporting limits at the dilutions utilized in the analyses [Ref. 6, pp. 329–330, 435–436, 456–457, 579]. This is equivalent to the HRS definition of SQL (i.e., the quantity of a hazardous substance that can be reasonably quantified given the limits of detection for the method of analysis and sample characteristics that may affect quantitation [e.g., dilution, concentration) [Ref. 1, Section 1.1].
(2) The sample is a field duplicate of sample 224121-IAB-77 [Ref. 6, p. 328].
(3) The sample is a field duplicate of sample 224121-IAB-80 [Ref. 6, p. 329].

Attribution to Subsurface Contamination

The Meeker Avenue Plume site is underlain by unconsolidated deposits associated with the Upper Glacial aquifer, an unsorted and unstratified mixture of sand, gravel, clay, and boulders [Ref. 27, p. 11]. The water table occurs in the Upper Glacial aquifer from approximately 10 ft bgs to 57 ft bgs at the site [Ref. 27, p. 38]. Materials encountered in the interval between the ground surface and groundwater (i.e., in the unsaturated zone) at the site primarily consist of sand and silt with varying amounts of gravel, clay, and fill material (e.g., bricks, asphalt, concrete, ash, cinders, roots); there are no confining layers in the unsaturated zone [Ref. 22, pp. 88–92, 3764–3799; 23, pp. 148–153, 1025, 1028, 1031, 1097–1221; 26, pp. 428–447, 734–738, 748–752, 756–765, 769–776, 780–785; 27, pp. 184–190, 425–456; 28, pp. 298–303, 588–630]. Based on slug test results from several monitoring wells, the hydraulic conductivity of the aquifer at the site ranges from 8.32×10^{-5} cm/s to 2.91×10^{-2} cm/s. [Ref. 26, pp. 136, 230]. Groundwater flow in the aquifer is generally to the east and northeast; the ExxonMobil recovery wells in the northern and northeastern portions of the site influence the groundwater migration of dissolved phase CVOCs [Ref. 27, pp. 38, 243].

During the March 2019 sampling event, subslab soil vapor samples collected concurrently with the indoor air samples showed that CVOCs are present in the subsurface directly beneath the AOEs, at levels up to 200,000 micrograms per cubic meter ($\mu g/m^3$) [Ref. 6, pp. 14–17, 79]. NYSDEC used standard procedures to document that

the contaminants were not being drawn into the subsurface from above: The subslab soil vapor sampling ports were installed and tested (and reinstalled if necessary) to ensure that indoor air was not entering the subslab soil during sampling [Ref. 6, pp. 12–13]. The subslab soil vapor and indoor air results indicate that the observed exposures at the site are associated with soil vapor intrusion [Ref. 6, pp. 22–53]. Historical subslab soil vapor and indoor air data also indicate that indoor air contamination at the site is associated with vapor intrusion [Ref. 16, pp. 24–39; 17, pp. 27–44, 114–118; 18, pp. 31, 111–139, 155–158; 19, pp. 29, 139–146, 166–169]. **Figures 5, 6, and 7** of this HRS documentation record illustrate the extent of subsurface contamination.

Consideration of Indoor Anthropogenic Origins

Indoor air, outdoor air, and subslab vapor sampling all were conducted according to procedures outlined in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York [Ref. 6, p. 11]. Prior to sampling, NYSDEC completed an inventory of chemicals found in each structure and screened indoor air with a ppb-range PID for possible origins of VOCs within each structure. Occupants of all structures were instructed to avoid activities that might interfere with the results prior to and during the air sampling [Ref. 6, pp. 11, 136, 144, 152–155, 165, 173, 181, 189, 197, 205, 213, 221, 229, 237, 245, 253, 261, 263]. In the structures that were found to be contaminated, NYSDEC did not report finding cis-1,2-DCE, PCE, TCE, or vinyl chloride in any products except for unopened stainless-steel cleaner in structure H-79 [Ref. 6, pp. 136, 152–55, 165, 173, 197, 221, 237, 245, 261].

Consideration of Outdoor Air Contamination

Outdoor air sampling was conducted to demonstrate that increased levels of hazardous substances in each indoor air sample are the result of subsurface intrusion and not outdoor air that has migrated into the structures [Ref. 1, Section 5.2.1.1.1; 6, pp. 11–12]. Sampling of outdoor air was conducted simultaneously with the corresponding indoor air sample(s); the sample collection, analytical, and validation procedures were identical for indoor air samples and their corresponding outdoor air samples [Ref. 6, pp. 11–13]. The outdoor air sampling information and results for each corresponding contaminated structure are presented below in **Tables 8 and 9**.

A comparison of the outdoor air results with the corresponding indoor air results (**Tables 6 and 7**) shows that each indoor air result that meets observed exposure criteria also surpasses the corresponding outdoor air result. In addition, corresponding subslab soil gas results for the structures indicate that the subsurface CVOC contamination extends beneath the buildings. The corresponding subslab soil gas results included 5.8 µg/m^3 PCE beneath H-67; 6,200 µg/m^3 PCE and 14 µg/m^3 TCE beneath H-69; 9,500 µg/m^3 PCE and 150 µg/m^3 TCE beneath H-70; 620 µg/m^3 PCE and 190 µg/m^3 TCE beneath H-71; 39 µg/m^3 PCE and 3.9 µg/m^3 TCE beneath H-74; 85 µg/m^3 PCE and 1,000 µg/m^3 TCE beneath H-77; 200,000 µg/m^3 PCE and 5,800 µg/m^3 TCE beneath H-79; and 470 µg/m^3 PCE and 260 µg/m^3 TCE beneath H-80 [Ref. 6, pp. 22–51]. The extensive subsurface contamination underlying both AOEs is shown in **Figures 5, 6, and 7**.

TABLE 8. AOE 1 / AOE 2 OUTDOOR (AMBIENT) AIR ATTRIBUTION SAMPLE LOCATIONS

Regularly Occupied Structure ID	Sample ID	Sample Location	Start Date and Time	End Date and Time	References
AOE 1					
H-67-1	224121-OA-67	backyard area	03/02/19 0918	03/03/19 0835	Ref. 6, pp. 20, 60, 129–136, 266, 302, 566
H-69	224121-OA-69	front office window on sidewalk	03/07/19 0919	03/07/19 1709	Ref. 6, pp. 20, 60, 145–155, 270, 304, 568
H-74	224121-OA-74	backyard	03/09/19 1410	03/10/19 1242	Ref. 6, pp. 20, 60, 190–197, 278, 310, 578
H-77-1	224121-OA-77	outside parking area	03/11/19 1034	03/11/19 1804	Ref. 6, pp. 20, 60, 214–221, 285, 314, 582

TABLE 8. AOE 1 / AOE 2 OUTDOOR (AMBIENT) AIR ATTRIBUTION SAMPLE LOCATIONS					
Regularly Occupied Structure ID	**Sample ID**	**Sample Location**	**Start Date and Time**	**End Date and Time**	**References**
AOE 2					
H-70-1 H-70-2	224121-OA-70	side door of building	03/08/19 0839	03/08/19 1446	Ref. 6, pp. 20, 60, 158–165, 273, 306, 574
H-71	224121-OA-71	backyard	03/09/19 0812	03/10/19 0712	Ref. 6, pp. 20, 60, 166–173, 274, 307, 578
H-79	224121-OA-79	courtyard	03/12/19 0946	03/12/19 1630	Ref. 6, pp. 20, 60, 230–237, 290, 317, 589
H-80-1 H-80-2	224121-OA-80	outside front of building	03/13/19 0925	03/13/19 1658	Ref. 6, pp. 20, 60, 238–245, 293, 319, 591
H-82-1	224121-OA-82	outside front of building	03/20/19 1125	03/20/19 1620	Ref. 6, pp. 20, 60, 254–261, 300, 323, 595

TABLE 9. AOE 1 / AOE 2 OUTDOOR (AMBIENT) AIR ATTRIBUTION SAMPLE CONCENTRATIONS				
Sample ID	**Eligible Hazardous Substance**	**Concentration (µg/m^3)**	**Sample Quantitation Limit (µg/m^3)**	**References**
AOE 1				
224121-OA-67	PCE	0.54 U	0.54	Ref. 6, pp. 327–330, 395, 566
224121-OA-69	PCE	1.2	0.54	Ref. 6, pp. 327–330, 415, 568
	TCE	0.19 U	0.19	
224121-OA-74	PCE	0.58	0.54	Ref. 6, pp. 327–330, 450, 578
224121-OA-77	PCE	0.11 U	0.54	Ref. 6, pp. 327–330, 353–354, 582, 584–588
	TCE	0.37	0.19	
AOE 2				
224121-OA-70	PCE	1.3	0.54	Ref. 6, pp. 327–330, 428, 574
224121-OA-71	PCE	1.8	0.54	Ref. 6, pp. 327–330, 434, 578
	TCE	0.19 U	0.19	
	Vinyl chloride	0.10 U	0.10	
224121-OA-79	Cis-1,2-DCE	0.16 U	0.16	Ref. 6, pp. 327–330, 506–507, 589
	PCE	2.1	0.54	
	TCE	0.19 U	0.19	
224121-OA-80	PCE	1.2	0.54	Ref. 6, pp. 327–330, 524, 591
	TCE	0.25	0.19	
224121-OA-82	PCE	0.62	0.54	Ref. 6, pp. 327–330, 560, 595

U – The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit [Ref. 6, p. 330].

Consideration of Possible Origins

Throughout the course of its investigations associated with the Meeker Avenue Plume site, NYSDEC has identified numerous possible origins of the subsurface CVOC contamination [Ref. 5, pp. 1–3; 6, pp. 7–8; 27, pp. 18–19, 42–51]. The site location has a long history of industrial activity—former or current industrial activities in the area that have been identified as possible origins of CVOC contamination include but are not limited to brass foundry operations; metal fabricating and metal plating operations; product manufacturing, including paints, lacquers, soaps, clothing, mattresses, and light fixtures; drum recycling; research laboratory operations; dyeing operations; and dry cleaning. Database searches and investigation results have indicated the presence of dozens of possible origins of

contamination throughout the site, some of which have been investigated; however, the subsurface CVOC contamination has not been definitively attributed to any single origin [Ref. 5, pp. 1–3; 6, pp. 7–8; 22, pp. 14–15; 23, pp. 25–28; 24, p. 15; 26, pp. 25–111]. Additional possible originating facilities continue to be identified and investigated [Ref. 27, pp. 37, 51]. **Figure 8** shows the locations of possible originating facilities identified by NYSDEC, which are located at and between the AOE locations.

The levels of subsurface contamination fluctuate across the site. Elevated contaminant levels in both groundwater and soil gas are often found near possible originating facilities of the CVOC contamination; however, elevated levels are also found in areas where possible origins have not been identified [see **Figures 6, 7, and 8**]. In some areas, multiple origins are suspected of contributing to the subsurface contamination [Ref. 26, pp. 142]. NYSDEC has collected soil samples during soil boring and monitoring well installations, as well as at and in the vicinity of possible originating facilities [Ref. 6, pp. 5–6; 14, pp. 1, 38–51].

Based on these considerations, the contamination detected in indoor air samples collected in the AOEs is the result of releases from the subsurface CVOC contamination.

Structure Containment

As presented above in the AOE, there are three residences and eight workplaces that have observed exposure documented through chemical analysis and are therefore assigned a containment value of 10 [Ref. 1, Table 5-12]. Consistent with HRS Section 5.2.1.1.2.1, for all the regularly occupied structures with unknown containment features, a structure containment value of greater than zero is assigned.

TABLE 10. AOE 1 / AOE 2 – STRUCTURE CONTAINMENT

Regularly Occupied Structure ID	Structure Containment Factor Value (Ref. 1, Table 5-12)	Rationale	References
AOE 1			
H-67-1 H-69 H-74 H-77-1	10	Evidence of subsurface intrusion with documented observed exposure	See AOE description above; Figure 3
All other structures in AOE 1	Greater than 0	Unknown containment features	Ref. 1, Section 5.2.1.1.2.1
AOE 2			
H-70-1 H-70-2 H-71 H-79 H-80-1 H-80-2 H-82-1	10	Evidence of subsurface intrusion with documented observed exposure	See AOE description above; Figure 4
All other structures in AOE 2	Greater than 0	Unknown containment features	Ref. 1, Section 5.2.1.1.2.1

AOE Hazardous Waste Quantity

Tier A Hazardous Constituent Quantity:

The total hazardous constituent quantity for AOE 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances to have entered the structures is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1 and 5.2.1.2.2). Insufficient historical and current data (air

concentration data, air flow data, etc.) are available to adequately calculate the total mass, or a partial estimate, of all CERCLA hazardous substances to have entered the structures. Therefore, there is insufficient information to calculate a total or partial hazardous constituent quantity estimate for AOE 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier B, Hazardous Wastestream Quantity (Ref. 1, Sections 2.4.2.1.1 and 5.2.1.2.2).

Hazardous Constituent Quantity Assigned Value: Not Scored
[Ref. 1, Table 5-19]

Hazardous Constituent Quantity Complete? No

Tier B Hazardous Wastestream Quantity:

The hazardous wastestream quantity for AOE 1 could not be adequately determined according to the HRS requirements; that is, the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants to have entered the structures is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2 and 5.2.1.2.2). Insufficient historical and current data (air concentration data, air flow data, etc.) are available to adequately calculate the total mass, or a partial estimate, of all hazardous wastestreams and CERCLA pollutants and contaminants to have entered the structures. Therefore, there is insufficient information to adequately calculate or extrapolate a total or partial Hazardous Wastestream Quantity for AOE 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, Volume (Ref. 1, Sections 2.4.2.1.2 and 5.2.1.2.2).

Hazardous Wastestream Quantity Assigned Value: Not Scored

Tier C Volume:

There are 61 occupied residential structures and 29 commercial/industrial structures (i.e., workplaces) within the AOEs (see **Figures 3 and 4**). Volume is calculated for each regularly occupied structure located within the areas of observed exposure that was sampled by NYSDEC in March 2019, some of which were shown by chemical analysis to be within an area of observed exposure and others of which are within an inferred AOE [Ref. 1, Section 5.2.1.2.2]. The volume of all other structures within the inferred AOEs is unknown.

The area in square feet (ft^2) of each structure sampled in March 2019 is documented [Ref. 6, pp. 20, 134, 142, 150, 163, 171, 179, 187, 195, 203, 211, 219, 227, 235, 243, 251, 259]. The ceiling height of each structure is unknown and not readily available; therefore, a ceiling height of 8 feet is used to calculate volume for each structure [Ref. 1, Section 5.2.1.2.2]. Volume calculations for these regularly occupied structures within AOE 1 and AOE 2 are shown below.

TABLE 11. AOE 1 / AOE 2 – VOLUME

Regularly Occupied Structure ID	Area (ft^2) (Regularly Occupied Structures)[1]	Volume (ft^3) (Section 5.2.1.2.2)	Volume(yd^3) (1 ft^3 /27 = 1 yd^3)	References
AOE 1				
H-67-1	1,320	10,560	391.11	6, p. 134
H-67-2	1,320	10,560	391.11	6, p. 134
H-69	7,056	56,448	2,090.66	6, p. 150
H-74	1,856	14,848	549.92	6, pp. 190,191, 193, 195

TABLE 11. AOE 1 / AOE 2 – VOLUME				
Regularly Occupied Structure ID	**Area (ft^2) (Regularly Occupied Structures)[1]**	**Volume (ft^3) (Section 5.2.1.2.2)**	**Volume(yd^3) (1 ft^3 /27 = 1 yd^3)**	**References**
H-77-1 (office/display rooms)	13,500	108,000	4,000.00	6, p. 219
H-77-2 (warehouse)	18,375	147,000	5,444.44	6, p. 219
H-77-3 (stone cutting room)	4,125	33,000	1,222.22	6, p. 219
H-68	800	6,400	237.03	6, p. 142
H-73	1,440	11,520	426.66	6, pp. 185, 187
H-75	928	7,424	274.96	6, p. 203
H-78	1,152	9,216	341.33	6, p. 227
AOE 1 Total Volume (cubic yards)			**15,369.44**	
AOE 2				
H-70-1 (manufacturing area)	600	4,800	177.77	6, p. 163
H-70-2 (office area)	4,400	35,200	1,303.70	6, p. 163
H-71	2,208	17,664	654.22	6, pp. 169, 171
H-79	11,400	91,200	3,377.77	6, p. 235; Figure 4
H-80-1 (office/showroom area)	5,000	40,000	1,481.48	6, p. 243
H-80-2 (warehouse/shop area)	6,275	50,200	1,859.25	6, p. 243
H-82-1 (shop areas)	27,500	220,000	8,148.14	6, pp. 256, 259
H-82-2 (office area)	2,500	20,000	740.74	6, pp. 256, 259
H-81	1,875	15,000	555.55	6, p. 251
AOE 2 Total Volume (cubic yards)			**18,298.62**	

ft^2 – square feet
ft^3 – cubic feet
yd^3 – cubic yards
[1] - Area includes two floors for H-67-1, H-67-2, and H-74. Area includes three floors for H-73 and H-71.

The total estimated volume (V) of each AOE in yd^3 is divided by 2.5 to assign the AOE a hazardous waste quantity value for volume [Ref. 1, Section 5.2.1.2.2, Table 5-19].

V (AOE 1): 15,369.44
V (AOE 1) / 2.5: 15,369.44 ÷ 2.5 = 6,147.776
Volume Assigned Value (AOE 1): 6,147.776

V (AOE 2): 18,298.62
V (AOE 2) / 2.5: 18,298.62 ÷ 2.5 = 7,319.448
Volume Assigned Value (AOE 2): 7,319.448

Tier D Area:

Area is calculated for the regularly occupied structures located within the areas of observed exposure where volume is unknown [Ref. 1, Section 5.2.1.2.2]. The actual footprint areas of 33 residential structures in AOE 1 (R-1, R-2, R-3, R-4, R-5, R-6, R-7, R-8, R-9, R-10, R-11, R-12, R-13, R-14, R-15, R-16, R-17, R-18, R-19, R-20, R-21, R-

22, R-23, R-24, R-25, R-26, R-27, R-28, R-29, R-30, R-31, R-32, and R-33), 15 workplaces in AOE 1 (W-1, W-2, W-3, W-4, W-5, W-6, W-7, W-8, W-9, W-10, W-11, W-12, W-13, W-14, and W-15), 20 residential structures in AOE 2 (R-34, R-35, R-36, R-37, R-38, R-39, R-40, R-41, R-42, R-43, R-44, R-45, R-46, R-47, R-48, R-49, R-50, R-51, R-52, and R-53), and 8 workplaces in AOE 2 (W-16, W-17, W-18, W-93, W-20, W-21, W-22, and W-23) are unknown; therefore, a value of 1,740 square feet for each of these 76 structures is used to calculate Tier D, Area [Ref. 1, Sec. 5.2.1.2.2]. The total estimated area (A) of each AOE is divided by 13 to assign the AOE a hazardous waste quantity value for area [Ref. 1, Section 5.2.1.2.2, Table 5-19].

A (AOE 1): 48 x 1,740 = 83,520
A (AOE 1) / 13: 83,520 ÷ 13 = 6,424.615
Area Assigned Value (AOE 1): 6,424.615

Sum of values (AOE 2): 48,720
A (AOE 2) / 13: 48,720 ÷ 13 = 3,747.692
Area Assigned Value (AOE 2): 3,747.692

AOE Hazardous Waste Quantity Value:

Per the HRS, the highest of the values assigned to each structure for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), or area (Tier D) should be assigned as the structure hazardous waste quantity value [Ref. 1, Section 2.4.2.1.5]. Volume (Tier C) is the highest value for the structures within the AOEs that were sampled by NYSDEC in March 2019; Area (Tier D) is the highest value for all other structures within the AOEs.

The total hazardous waste quantity values for AOE 1 and AOE 2 are shown below.

TABLE 12. AOE 1 HAZARDOUS WASTE QUANTITY

Tier Evaluated	AOE 1 Values
A	Not Scored
B	Not Scored
C	6,147.776
D	6,424.615

AOE 1 Hazardous Waste Quantity Value: 12,572.391

TABLE 13. AOE 2 HAZARDOUS WASTE QUANTITY

Tier Evaluated	AOE 2 Values
A	Not Scored
B	Not Scored
C	7,319.448
D	3,747.692

AOE 2 Hazardous Waste Quantity Value: 11,067.140

TABLE 14. HAZARDOUS WASTE QUANTITY SUMMARY

AOE Number	Hazardous Waste Quantity Value	Hazardous Constituent Quantity Complete? (Y/N)
AOE 1	12,572.391	N
AOE 2	11,067.140	N
Total – AOE 1 and AOE 2	23,639.531	N

5.2.1 SUBSURFACE INTRUSION COMPONENT

5.2.1.1 LIKELIHOOD OF EXPOSURE

5.2.1.1.1 Observed Exposure

The documentation and analytical results presented above in **Section 5.2.0** demonstrate that hazardous substances have been released into regularly occupied structures via the subsurface, thereby establishing observed exposure for the site [Ref. 1, Section 5.2.1.1.1]. Specifically, indoor air samples from three occupied residential structures and six occupied workplaces exhibited concentrations of cis-1,2-DCE, PCE, TCE, and vinyl chloride that meet observed exposure criteria (see **Observed Exposure by Chemical Analysis in Section 5.2.0**). The indoor air samples that meet observed exposure criteria are listed in **Table 15** below. See **Figures 3 and 4** for the release sample locations and see **Tables 6 and 7** for observed exposure sample location descriptions and analytical results.

TABLE 15. SAMPLES DOCUMENTING OBSERVED EXPOSURE

AOE Number	Regularly Occupied Structure ID	Sample ID	Eligible Hazardous Substance(s)	References
1	H-67-1	224121-IA-67	PCE	Ref. 6, pp. 20, 60, 129–136, 265, 302, 327–330, 392, 566
	H-69	224121-IAA-69 224121-IAB-69	PCE, TCE PCE, TCE	Ref. 6, pp. 20, 60, 145–155, 268, 304, 327–330, 405, 408, 568
	H-74	224121-IA-74	PCE	Ref. 6, pp. 20, 60, 190–197, 277, 310, 327–330, 446, 578
	H-77-1	224121-IAB-77 FD-20190311-1(1) 224121-IAC-77	TCE TCE PCE, TCE	Ref. 6, pp. 20, 60, 214–221, 282, 313–314, 327–330, 466, 468, 470, 582
2	H-70-1	224121-IAA-70 224121-IAB-70	PCE PCE	Ref. 6, pp. 20, 60, 158–165, 270, 271, 305, 327–330, 417, 419, 574
	H-70-2	224121-IAC-70	PCE	Ref. 6, pp. 20, 60, 158–165, 271, 305, 327–330, 421, 574
	H-71	224121-IA-71	PCE, TCE, Vinyl chloride	Ref. 6, pp. 20, 60, 166–173, 273, 307, 327–330, 430, 578
	H-79	224121-IAA-79 224121-IAB-79 224121-IAC-79	Cis-1,2-DCE, PCE, TCE PCE, TCE PCE, TCE	Ref. 6, pp. 20, 60, 230–237, 287, 288, 316, 317, 327–330, 491–492, 494, 496, 589
	H-80-1	224121-IAA-80 224121-IAB-80 FD-20190313-2(2)	PCE PCE PCE, TCE	Ref. 6, pp. 20, 60, 238–245, 290, 291, 318, 319, 327–330, 509, 511, 513, 591
	H-80-2	224121-IAC-80	PCE	Ref. 6, pp. 20, 60, 238–245, 291, 319, 327–330, 516, 591
	H-82-1	224121-IAA-82 224121-IAB-82	PCE PCE	Ref. 6, pp. 20, 60, 254–261, 295, 321, 327–330, 532, 536, 595

(1) The sample is a field duplicate of sample 224121-IAB-77 [Ref. 6, p. 328].
(2) The sample is a field duplicate of sample 224121-IAB-80 [Ref. 6, p. 329].

An observed exposure factor value of 550 is assigned because observed exposure is established in regularly occupied structures [Ref. 1, Sec. 5.2.1.1.1].

SsI Component Observed Exposure Factor Value: 550

5.2.1.1.3 Calculation of Likelihood of Exposure Factor Category Value

A likelihood of exposure factor category value is assigned because observed exposure is established for the site [Ref. 1, Section 5.2.1.1.3].

Likelihood of Exposure Factor Category Value: 550

5.2.1.2 WASTE CHARACTERISTICS

5.2.1.2.1 Toxicity/Degradation

The hazardous substances associated with the site include cis-1,2-DCE, PCE, TCE, and vinyl chloride, all of which are present in at least one of the two AOEs (see **Section 5.2.0**). The toxicity and degradation factor values for the AOE contaminants are shown below.

Toxicity Factor Value

TABLE 16. TOXICITY FACTOR VALUES

Eligible Hazardous Substance	AOE Number	Toxicity Factor Value	References
Cis-1,2-DCE	AOE 2	1,000	Ref. 2, p. 1
PCE	AOE 1, AOE 2	100	Ref. 2, p. 3
TCE	AOE 1, AOE 2	1,000	Ref. 2, p. 5
Vinyl chloride	AOE 2	10,000	Ref. 2, p. 7

Degradation Factor Value

TABLE 17. DEGRADATION FACTOR VALUES

Eligible Hazardous Substance	AOE Number	Substance Present in AOE or NAPL? (Y/N)	Depth to Contamination (Ref. 1, Sec. 5.2.1.1.2.2)	Half-life (Days)	Degradation Factor Value (Ref. 1, Table 5-18) [1]	References
Cis-1,2-DCE	AOE 2	Y	N/A	N/A	1	**Table 7**
PCE	AOE 1, AOE 2	Y	N/A	N/A	1	**Table 7**
TCE	AOE 1, AOE 2	Y	N/A	N/A	1	**Table 7**
Vinyl chloride	AOE 2	Y	N/A	N/A	1	**Table 7**

[1] Any hazardous substance that meets the criteria for observed exposure (i.e., the substances present in the AOEs) have an assigned degradation factor value of 1 [Ref. 1, Section 5.2.1.2.1.2].

Toxicity/Degradation Factor Value

TABLE 18. TOXICITY/DEGRADATION FACTOR VALUES

Eligible Hazardous Substance	AOE Number	Toxicity	Degradation Factor Value (Ref. 1, Table 5-18)	Toxicity/Degradation Factor Value
Cis-1,2-DCE	AOE 2	1,000	1	1,000
PCE	AOE 1, AOE 2	100	1	100

TABLE 18. TOXICITY/DEGRADATION FACTOR VALUES				
Eligible Hazardous Substance	**AOE Number**	**Toxicity**	**Degradation Factor Value (Ref. 1, Table 5-18)**	**Toxicity/Degradation Factor Value**
TCE	AOE 1, AOE 2	1,000	1	1,000
Vinyl chloride	AOE 2	10,000	1	10,000

Substance(s) with the highest combined toxicity/degradation factor value: Vinyl chloride

Toxicity/Degradation Factor Value [Ref. 1, Section 5.2.1.2.1.3]: 10,000

5.2.1.2.2 Hazardous Waste Quantity for Subsurface Intrusion Component

TABLE 19. HAZARDOUS WASTE QUANTITY FOR SUBSURFACE INTRUSION COMPONENT	
AOE Number	**AOE Hazardous Waste Quantity Value (see Section 5.2.0)**
AOE 1	12,572.391
AOE 2	11,067.140

Sum of AOE Values: 23,639.531

The hazardous waste quantity value of 22,942.679, which is based on estimates of AOE volumes for structures with known volumes and on estimates of AOE areas for buildings with unknown volumes, corresponds to a hazardous waste quantity factor value of 10,000 [Ref. 1, Table 2-6]. The hazardous constituent quantity is not adequately determined for the areas of observed exposure, and targets are subject to Level I or Level II concentrations. In this situation, the HRS proscribes assigning the higher of the value from Table 2-6 or a value of 100, whichever is greater, as the hazardous waste quantity factor value for the SsI component [Ref. 1, Section 5.2.1.2.2]. Therefore, a value of 10,000 is assigned as the hazardous waste quantity factor value.

Hazardous Waste Quantity Factor Value: 10,000

5.2.1.2.3 Calculation of Waste Characteristics Factor Category Value

The waste characteristics factor category value is determined by multiplying the toxicity/degradation and hazardous waste quantity factor values, subject to a maximum product of 1×10^8, and assigning a value from HRS Table 2-7 based on the product [Ref. 1, Section 5.2.1.2.3]. The product for the site is 1×10^8, which corresponds to a waste characteristics factor category value of 100 in HRS Table 2-7.

Toxicity/Degradation Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 10,000

Toxicity Factor Value x Hazardous Waste Quantity Factor Value: 100,000,000 (1×10^8)

Waste Characteristics Factor Category Value: 100

5.2.1.3 TARGETS

There are 39 regularly occupied residences and 17 regularly occupied workplaces within AOE 1, and there are 22 regularly occupied residences and 12 regularly occupied workplaces within AOE 2, for a total of 90 regularly occupied structures which constitute the site (see **Figures 3 and 4 and Section 5.2.0**).

TABLE 20. TYPES OF STRUCTURES/POPULATIONS IN THE AOEs

AOE Number	Type of Structure	Number(s) of Specific Type of Structure [1]	Type of Population	References
1	Residence	39	residents	Figure 3
	Workplace	17	workers	Figure 3
2	Residence	22	residents	Figure 4
	Workplace	12	workers	Figure 4

[1] Five of the structures include subunits (see **Table 1** and **Table 2**).

TABLE 21. HAZARDOUS SUBSTANCES THAT EQUAL OR EXCEED HEALTH-BASED BENCHMARKS

AOE No.	Sample ID	Eligible Hazardous Substance	Hazardous Substance Concentration (µg/m^3)	Benchmark Concentration (µg/m^3)	Benchmark (Ref. 1, Table 5-20)	References
1	224121-IAA-69	TCE	2.4	0.478 2.09	Cancer risk Non-cancer risk	2, p. 5; 6, pp. 327–330, 405, 568
	224121-IAB-69	TCE	3.1	0.478 2.09	Cancer risk Non-cancer risk	2, p. 5; 6, pp. 327–330, 408, 568
	224121-IAB-77	TCE	1.4	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 466, 582
	FD-20190311-1(1)	TCE	1.5	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 468, 582
	224121-IAC-77	TCE	1.1	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 470, 582
2	224121-IA-71	TCE	0.81	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 430, 578
		Vinyl chloride	0.27	0.168	Cancer risk	2, p. 7; 6, pp. 327–330, 430, 578
	224121-IAA-79	PCE	46	10.8 41.7	Cancer risk Non-cancer risk	2, p. 3; 6, pp. 327–330, 492, 589
		TCE	0.54	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 492, 589
	224121-IAB-79	PCE	16	10.8	Cancer risk	2, p. 3; 6, pp. 327–330, 494, 589
	224121-IAC-79	PCE	34	10.8	Cancer risk	2, p. 3; 6, pp. 327–330, 496, 589
		TCE	0.79	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 496, 589
	FD-20190313-2(2)	TCE	0.49	0.478	Cancer risk	2, p. 5; 6, pp. 327–330, 513, 591
	224121-IAC-80	PCE	140	10.8 41.7	Cancer risk Non-cancer risk	2, p. 3; 6, pp. 327–330, 516, 591

(1) The sample is a field duplicate of sample 224121-IAB-77 [Ref. 6, p. 328].
(2) The sample is a field duplicate of sample 224121-IAB-80 [Ref. 6, p. 329].

5.2.1.3.1 Exposed Individual

There are exposed individuals in one regularly occupied residential structure and in four regularly occupied industrial structures (i.e., workplaces) subject to Level I concentrations (i.e., concentrations above health-based benchmarks), as shown above in **Table 21** and as displayed in **Figures 3 and 4**.

AOE Number: AOE 1
Regularly Occupied Structure ID: H-69
Sample IDs: 224121-IAB-69
Eligible Hazardous Substance: TCE
Hazardous Substance Concentration: 3.1 µg/m^3
Benchmark Concentration: 0.478 µg/m^3 (cancer risk), 2.09 µg/m^3 (non-cancer risk)
Level of Contamination (Level I/Level II/Potential): Level I
Reference: [2, p. 5; 6, pp. 148, 150, 327–330, 408, 568]

AOE Number: AOE 2
Regularly Occupied Structure ID: H-71
Sample ID: 224121-IA-71
Eligible Hazardous Substance: Vinyl chloride
Hazardous Substance Concentration: 0.27 µg/m^3
Benchmark Concentration: 0.168 µg/m^3 (cancer risk)
Level of Contamination (Level I/Level II/Potential): Level I
Reference: [2, p. 7; 6, pp. 166, 169, 171, 327–330, 430, 578]

AOE Number: AOE 2
Regularly Occupied Structure ID: H-79
Sample ID: 224121-IAA-79
Eligible Hazardous Substance: PCE
Hazardous Substance Concentration: 46 µg/m^3
Benchmark Concentration: 10.8 µg/m^3 (cancer risk), 41.7 µg/m^3 (non-cancer risk)
Level of Contamination (Level I/Level II/Potential): Level I
Reference: [2, p. 3; 6, pp. 230, 233, 235, 327–330, 492, 589]

These data demonstrate that there is at least one exposed individual in one or more regularly occupied structures subject to Level I concentrations; therefore, a value of 50 is assigned as the exposed individual factor value [Ref. 1, Section 5.2.1.3.1].

Exposed Individual Factor Value: 50

5.2.1.3.2 Population

Population is evaluated based on two factors, Level I concentrations and Level II concentrations. Population within an area of subsurface contamination is not considered for this scoring evaluation.

For the structures that were documented in the AOEs through chemical analysis, the actual population is used (if reported). For residential structures where the actual population was not reported and for residential structures in the inferred AOEs, where the actual population counts were not readily available, the Kings County (i.e., Brooklyn) average of 2.69 persons per household is used [Ref, 1, Section 5.2.1.3.2; 12, p. 2]. For commercial and industrial structures (i.e., workplaces) where the actual population was not reported and was not readily available, a default value of 1 full-time worker per structure is used.

5.2.1.3.2.1 Level I Concentrations

Level I concentrations are media-specific concentrations for the target that meet the criteria for observed exposure for the pathway and are at or above SsI component-specific benchmark values, as shown in **Table 21** above [Ref. 1, Section 2.5; 2, pp. 3, 5, 7]. Information for AOEs 1 and 2 can be found in **Section 5.2.0**. The regularly occupied structures that meet observed exposure criteria and exhibit Level I concentrations are listed below.

Level I Population

TABLE 22. LEVEL I POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID	No. of Exposed Individuals (non-workers)	Number of Full-time Workers		Number of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual No.	Adjusted (No./3)	Actual No.	Adjusted (No./3)		
1	H-69	224121-IAA-69 224121-IAB-69	0	1	0.33	0	0	0.33	2, p. 5; 6, pp. 145, 148, 405, 408
	H-77-1	224121-IAB-77 FD-20190311-1[(1)] 224121-IAC-77	0	50[(3)]	16.66	0	0	16.66	2, p. 5; 6, pp. 214, 217, 466, 468, 470
2	H-71	224121-IA-71	4	0	0	0	0	4	2, pp. 5, 7; 6, pp. 166, 169, 430
	H-79	224121-IAA-79 224121-IAB-79 224121-IAC-79	0	8	2.66	0	0	2.66	2, pp. 3, 5; 6, pp. 230, 233, 492, 494, 496
	H-80-1 H-80-2	FD-20190313-2[(2)] 224121-IAC-80	0	20	6.66	0	0	6.66	2, pp. 3, 5; 6, pp. 238, 241, 513, 516

[(1)] The sample is a field duplicate of sample 224121-IAB-77 [Ref. 6, p. 328].
[(2)] The sample is a field duplicate of sample 224121-IAB-80 [Ref. 6, p. 329].
[(3)] The subunit H-77-1 includes the building's locker room/bathroom area (i.e., a shared area); therefore, all workers in the building are counted as being regularly present in an area of observed exposure subject to Level I concentrations [Ref. 1, Section 5.2.1.3.2.1; 6, pp. 219, 314].

Sum of regularly occupied structures' total population values subject to Level I concentrations: 30.31

Sum of regularly occupied structures' total population values subject to Level I concentrations x 10: 303.1

Level I Concentrations Factor Value: 303.1

5.2.1.3.2.2 Level II Concentrations

Level II concentrations are exhibited by structures with one or more samples that meet the criteria for observed exposure by chemical analysis but do not exhibit Level I concentrations (i.e., all observed exposure concentrations in the structure are below the SsI component-specific benchmarks) [Ref. 1, Sec. 5.2.1.3.1]. There are four structures with documented Level II concentrations that do not exhibit Level I concentrations. Structures that are inferred to be in the AOEs are also assigned Level II concentrations [Ref. 1, Section 5.2.1.3.1]. Information for AOEs 1 and 2 can be found in **Section 5.2.0**. The structures that exhibit Level II concentrations through chemical analysis or are inferred to be in an AOE due to their locations are listed below.

Level II Population

TABLE 23. LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred	No. of Exposed Individuals (non-workers)	Number of Full-time Workers		Number of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
1	H-67-1	224121-IA-67	1	0	0	0	0	1	Ref. 2, p. 3; 6, pp. 129, 132, 134, 392
1	H-67-2	Inferred	2.69	0	0	0	0	2.69	Ref. 6, pp. 129, 132, 134, 392; 12, p. 2
1	H-74	224121-IA-74	7	0	0	0	0	7	Ref. 2, p. 3; 6, pp. 190, 195, 446
1	H-68	Inferred	3	0	0	0	0	3	Figure 3; Ref. 6, pp. 137, 140, 142
1	H-73	Inferred	9	0	0	0	0	9	Figure 3; Ref. 6, pp. 182, 185, 187
1	H-75	Inferred	3	0	0	0	0	3	Figure 3; Ref. 6, pp. 198, 201, 203
1	H-78	Inferred	1	0	0	0	0	1	Figure 3; Ref. 6, pp. 222, 225, 227
1	R-1	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-2	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-3	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-4	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-5	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-6	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-7	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-8	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-9	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-10	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-11	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-12	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2

TABLE 23. LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred	No. of Exposed Individuals (non-workers)	Number of Full-time Workers		Number of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
1	R-13	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-14	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-15	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-16	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-17	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-18	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-19	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-20	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-21	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-22	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-23	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-24	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-25	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-26	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-27	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-28	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-29	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-30	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-31	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-32	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	R-33	Inferred	2.69	0	0	0	0	2.69	Figure 3; Ref. 12, p. 2
1	W-1	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-2	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-3	Inferred	0	1	0.33	0	0	0.33	Figure 3

TABLE 23. LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred	No. of Exposed Individuals (non-workers)	Number of Full-time Workers		Number of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
1	W-4	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-5	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-6	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-7	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-8	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-9	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-10	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-11	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-12	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-13	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-14	Inferred	0	1	0.33	0	0	0.33	Figure 3
1	W-15	Inferred	0	1	0.33	0	0	0.33	Figure 3
2	H-70-1 H-70-2	224121-IAA-70 224121-IAB-70 224121-IAC-70	0	7	2.33	0	0	2.33	Ref. 2, p. 3; 6, pp. 158, 161, 163, 417, 419, 421
2	H-82-1 H-82-2	224121-IAA-82 224121-IAB-82 Inferred	0	35	11.66	0	0	11.66	Ref. 2, p. 3; 6, pp. 254, 257, 259, 532, 536
2	H-81	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 6, pp. 246, 249, 251; 12, p. 2
2	R-34	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-35	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-36	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-37	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-38	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-39	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-40	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-41	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-42	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-43	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-44	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-45	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2

TABLE 23. LEVEL II POPULATION

AOE No.	Regularly Occupied Structure ID	Sample ID/Inferred	No. of Exposed Individuals (non-workers)	Number of Full-time Workers		Number of Part-time Workers		Regularly Occupied Structure's Total Population Value	References
				Actual #	Adjusted (#/3)	Actual #	Adjusted (#/3)		
2	R-46	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-47	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-48	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-49	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-50	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-51	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-52	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	R-53	Inferred	2.69	0	0	0	0	2.69	Figure 4; Ref. 12, p. 2
2	W-16	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-17	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-18	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-19	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-20	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-21	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-22	Inferred	0	1	0.33	0	0	0.33	Figure 4
2	W-23	Inferred	0	1	0.33	0	0	0.33	Figure 4

Sum of regularly occupied structures' total population values subject to Level II concentrations: 192.5

The sum of the population values for all Level II structures is assigned as the Level II concentrations factor value [Ref. 1, Section 5.2.1.3.2.2].

Level II Concentrations Factor Value: 192.5

5.2.1.3.2.3 Population within Area(s) of Subsurface Contamination

Population within an area of subsurface contamination (ASC) is not evaluated for this site.

Population within an ASC Factor Value: Not Scored

5.2.1.3.2.4 Calculation of Population Factor Value

The population factor value is the sum of the factor values for Level I concentrations, Level II concentrations, and population within the ASCs [Ref. 1, Section 5.2.1.3.2.4].

Level I Concentrations Factor Value: 303.1
Level II Concentrations Factor Value: 192.5
Population within an ASC Factor Value: Not Scored

Level I Concentrations + Level II Concentrations + Population within an ASC: 303.1 + 192.5 + 0 = 495.6

Population Factor Value: 495.6

5.2.1.3.3 Resources

The available information does not document resource use of any regularly occupied structures within AOE 1 or AOE 2 [Ref. 13, pp. 1–6]. Therefore, a value of 0 is assigned for the resources factor [Ref. 1, Section 5.2.1.3.3].

Resources Factor Value: 0

5.2.1.3.4 Calculation of Targets Factor Category Value

The sum of the values for the exposed individual, population, and resources factors is assigned as the targets factor category value for the subsurface intrusion component [Ref. 1, Section 5.2.1.3.4].

Exposed Individual Factor Value: 50
Population Factor Value: 495.6
Resources Factor Value: 0

Exposed Individual + Population + Resources: 50 + 495.6 + 0 = 545.6

Targets Factor Category Value: 545.6

APPENDIX 1

HRS AOE-Specific Site Score Worksheets
HRS Scoring Information Showing That AOE 1 Will Score Above 28.50 Independently and Qualify for the NPL

WORKSHEET FOR COMPUTING HRS SITE SCORE
Meeker Avenue Plume – AOE 1
Brooklyn, NY

	S	S^2
1. Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c. Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	
3a. Soil Exposure Component Score (S_{se}) (from Table 5-1, line 22)	Not Scored	
3b. Subsurface Intrusion Component Score (S_{ssi}) (from Table 5-11, line 12)	100.00	10,000
3c. Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi}) (from Table 5-11, line 13)	100.00	10,000
4. Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5. Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$	10,000	
6. **HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

NOTE: The HRS Site Score for AOE 1 is based on the following:

- Observed Exposure (OE) Factor Value = 550 [structures H-67, H-69, H-74, H-77]
- Toxicity/Degradation values for OE contaminants (TCE and PCE) = 1,000
- Hazardous Waste Quantity Value = 12,572.391
- Hazardous Waste Quantity Factor Value = 10,000
- Waste Characteristics Product = 1,000 x 10,000 = 10^7
- Waste Characteristics Factor Category Value = 56
- Level I Exposed Individual [structures H-69, H-77]
- Level I Population Factor Value = 16.99 x 10 = 169.9
- Level II Population Factor Value = 120.4

HRS Table 5-11, Subsurface Intrusion Component Scoresheet
Meeker Avenue Plume – AOE 1
Brooklyn, NY

Factor Categories and Factors	Maximum Value	Value Assigned
Subsurface Intrusion Component		
Likelihood of Exposure:		
14. Observed Exposure	550	**550**
15. Potential for Exposure		
2a. Structure Containment	10	**Not Scored**
2b. Depth to contamination	10	**Not Scored**
2c. Vertical Migration	15	**Not Scored**
2d. Vapor Migration Potential	25	**Not Scored**
16. Potential for Exposure (lines 2a * (2b+2c+2d), subject to a maximum of 500)	500	**Not Scored**
17. Likelihood of Exposure (higher of lines 1 or 3)	550	**550**
Waste Characteristics:		
18. Toxicity/Degradation	(a)	**1,000**
19. Hazardous Waste Quantity	(a)	**10,000**
20. Waste Characteristics (subject to a maximum of 100)	100	**56**
Targets:		
21. Exposed Individual	50	**50**
22. Population:		
9a. Level I Concentrations	(b)	**169.9**
9b. Level II Concentrations	(b)	**120.4**
9c. Population within an Area of Subsurface Contamination	(b)	**Not Scored**
9d. Total Population (lines 9a + 9b + 9c)	(b)	**290.3**
23. Resources	5	**Not Scored**
24. Targets (lines 8 + 9d + 10)	(b)	**340.3**
Subsurface Intrusion Component Score		
25. Subsurface Intrusion Component (lines 4 x 7 x 11)/82,500[c] (subject to a maximum of 100)	100	**100.00**
Soil Exposure and Subsurface Intrusion Pathway Score		
26. Soil Exposure Component + Subsurface Intrusion Component (subject to a maximum of 100)	100	**100.00**

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to the nearest integer.

APPENDIX 2

HRS AOE-Specific Site Score Worksheets
HRS Scoring Information Showing That AOE 2 Will Score Above 28.50 Independently and Qualify for the NPL

WORKSHEET FOR COMPUTING HRS SITE SCORE
Meeker Avenue Plume – AOE 2
Brooklyn, NY

	S	S^2
1. Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c. Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	
3a. Soil Exposure Component Score (S_{se}) (from Table 5-1, line 22)	Not Scored	
3b. Subsurface Intrusion Component Score (S_{ssi}) (from Table 5-11, line 12)	100.00	10,000
3c. Soil Exposure and Subsurface Intrusion Pathway Score (S_{sessi}) (from Table 5-11, line 13)	100.00	10,000
4. Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5. Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$	10,000	
6. **HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

NOTE: The HRS Site Score for AOE 2 is based on the following:

- Observed Exposure (OE) Factor Value = 550 [structures H-70, H-71, H-79, H-80, H-82]
- Toxicity/Degradation values for OE contaminants (PCE, TCE, cis-1,2-DCE, and Vinyl Chloride) = 10,000
- Hazardous Waste Quantity Value = 11,067.140
- Hazardous Waste Quantity Factor Value = 10,000
- Waste Characteristics Product = 10,000 x 10,000 = 10^8
- Waste Characteristics Factor Category Value = 100
- Level I Exposed Individual [H-71, H-79, H-80]
- Level I Population Factor Value = 13.32 x 10 = 133.2
- Level II Population Factor Value = 73.1

HRS Table 5-11, Subsurface Intrusion Component Scoresheet
Meeker Avenue Plume – AOE 2
Brooklyn, NY

Factor Categories and Factors	Maximum Value	Value Assigned
Subsurface Intrusion Component		
Likelihood of Exposure:		
27. Observed Exposure	550	**550**
28. Potential for Exposure		
2a. Structure Containment	10	**Not Scored**
2b. Depth to contamination	10	**Not Scored**
2c. Vertical Migration	15	**Not Scored**
2d. Vapor Migration Potential	25	**Not Scored**
29. Potential for Exposure (lines 2a * (2b+2c+2d), subject to a maximum of 500)	500	**Not Scored**
30. Likelihood of Exposure (higher of lines 1 or 3)	550	**550**
Waste Characteristics:		
31. Toxicity/Degradation	(a)	**10,000**
32. Hazardous Waste Quantity	(a)	**10,000**
33. Waste Characteristics (subject to a maximum of 100)	100	**100**
Targets:		
34. Exposed Individual	50	**50**
35. Population:		
9a. Level I Concentrations	(b)	**133.2**
9b. Level II Concentrations	(b)	**73.1**
9c. Population within an Area of Subsurface Contamination	(b)	**Not Scored**
9d. Total Population (lines 9a + 9b + 9c)	(b)	**206.3**
36. Resources	5	**Not Scored**
37. Targets (lines 8 + 9d + 10)	(b)	**256.3**
Subsurface Intrusion Component Score		
38. Subsurface Intrusion Component (lines 4 x 7 x 11)/82,500[c] (subject to a maximum of 100)	100	**100.00**
Soil Exposure and Subsurface Intrusion Pathway Score		
39. Soil Exposure Component + Subsurface Intrusion Component (subject to a maximum of 100)	100	**100.00**

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to the nearest integer.