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Supplemental Site Characterization Work Plan

655-671 Stanley Avenue, Brooklyn, New York
NYSDEC Site #224415

October 2025

Prepared for:
Unidos ZR LLC

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street
Long Island City, NY 11101

Prepared by:
Castleton Environmental Geologic Services DPC
70 West Main Street
Babylon, New York 11702

Project Number:
ZDEZ2501

SUPPLEMENTAL SITE CHARACTERIZATION WORK PLAN
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
OCTOBER 2025
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2501

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I, Jessica Ferngren, PG, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Site Characterization Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and DER Green Remediation (DER-31).

Jessica Ferngren

Name



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1.0 INTRODUCTION

On behalf of Unidos ZR LLC, Castleton Environmental Geologic Services DPC (Castleton) has prepared the following Supplemental Site Characterization Work Plan for the property located at 655-671 Stanley Avenue, Brooklyn, New York (the site). This supplemental work plan was developed in response to the requested work by NYSDEC in a letter dated August 29, 2025 and subsequent correspondence. This work plan includes the site history, summary of previous investigations, and the Supplemental Site Characterization approach and field activities proposed to determine environmental site status.

2.0 SITE BACKGROUND

2.1 Site Description

The site is located at 655-671 Stanley Avenue, Brooklyn, New York (Figure 1). The site consists of one (1) irregular-shaped parcel with an estimated area of 0.34 acres in size. The site is improved with one (1) commercial building with one (1) floor, full basement, and asphalt-paved parking lots in the front and rear of the building which is at basement grade. The building has an estimated gross floor area of 11,330 square feet and contains a total of three (3) commercial units ((City Fresh Market, one (1) vacant unit (former Lily's Dry Cleaner), and Tex's Chicken & Burgers)). A review of the New York City Building Department property profile overview indicated that the existing building was constructed in 1950. The building occupies most of the parcel and is bordered by landscaped areas, municipal walkways, and right-of-ways.

The site is bound to the south by Stanley Avenue, to the north by commercial and residential properties, to the east by a commercial property and Hendrix Street, and to the west by commercial properties with Van Siclen Avenue beyond.

A land use and sensitive receptor map is included as Figure 2. The site plan is included as Figure 3.

2.2 Site Environmental Setting

The surface topography of the Site and surrounding vicinity was obtained from the USGS (https://apps.nationalmap.gov/downloader/#/). The topographic elevation of the Site is approximately 10-15 feet above mean sea level (MSL) at sidewalk grade.

Soil observed during the previous investigation events consisted primarily of fine sand and silt. Groundwater was observed at approximately 1 to 2 feet below basement grade and between 10 and 10.5 feet below sidewalk grade to the south of the building along Stanley Avenue.

The site is located within the Atlantic Coastal Plain physiographic province of New York. This province is characterized by an eastward thickening wedge of sediment deeply underlain by a metamorphic bedrock. Although this area is part of the Coastal Plain, the regional geology is

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characterized by depositional landforms of continental glaciers created through the retreat of the Wisconsin ice sheet in the Late Cretaceous and Pleistocene. Locally the unconsolidated sands and gravels associated with the outwash plains predominate at depth. Shallower surface soils in the vicinity of the Site are characterized as urban fill materials. Regionally, groundwater flow is southerly toward Jamaica Bay.

2.3 Site History

Currently, the building contains a total of three (3) commercial units (City Fresh Market, former Lily's Dry Cleaner, and Tex's Chicken & Burgers).

A review of the New York City Building Department property profile overview indicated that the existing building was constructed in 1950.

Previous tenants of the site include:

- Supermarkets from 1960 through present
- A dry cleaner on the 663 Stanley Avenue portion of the site on the 1965 through 2007
- Several retail stores including bakeries, laundry, pharmacy, clothing and fabric stores, and other miscellaneous retail sales.

2.4 Previous Investigations

Previous investigations conducted for due diligence purposes in 2023, prior to the current owner purchasing the property, identified chlorinated volatile organic compounds (VOCs) including tetrachloroethene (PCE) in groundwater, indoor air, and subsurface vapor. At the time of the previous investigations, an active dry cleaner was on-site. The dry cleaner ceased operations and vacated the site in May 2023 when the current owner took possession of the property.

Phase II Environmental Site Assessment (ESA) – February 2023

Castleton completed a Phase II ESA in February 2023. The objective of this investigation was to assess on-site subsurface quality in relation to on-site dry cleaning operations. This objective was met by the performance of a geophysical survey and the collection and laboratory analysis of soil, groundwater, ambient air, and vapor samples.

During the geophysical survey, accessible areas of the dry cleaner tenant space basement were inspected and scanned. No evidence of floor drains was observed. The municipal sewer connection was found to extend under the adjacent tenant spaces.

Three soil borings were advanced, and three soil samples and three groundwater samples collected for laboratory analysis. Soil analytical results reported concentrations of volatile organic compounds (VOCs) below Unrestricted Use soil cleanup objectives (SCOs) or as non-detect. Tetrachloroethene (PCE), a common dry cleaning chemical, was detected in one of the three soil samples below Unrestricted Use SCOs. Groundwater analytical results reported concentrations of one VOC, PCE slightly above AWQS in one of the three groundwater samples analyzed at 5.9

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ug/l with the standard at 5 ug/l. PCE was detected below applicable standards in the two other groundwater samples. All other VOCs were reported as non-detect.

Four indoor air samples and one sub-slab vapor sample were collected, and laboratory analyzed for VOCs. Indoor air sample results reported concentrations of PCE above AGVs in the four air samples analyzed ranging from 902 ug/m^3 within the vacant space to 1,970 ug/m^3 within the grocery space. The reported concentrations in sub-slab vapor (3.97 ug/m^3) and the highest indoor air analytical concentrations were entered into the applicable NYSDOH matrices. The NYSDOH recommended action for PCE is to "Identify Sources and Resample or Mitigate".

Since the highest indoor air concentrations were reported in the adjacent grocery space, Castleton recommended additional investigation to determine if dry cleaning contaminants have migrated beneath this tenant space.

Analytical summary maps are included as Figures 4, 5, and 6. The report is included in Appendix A.

Supplemental Phase II ESA – March 2023

Castleton completed a Supplemental Phase II ESA in March 2023. The objective of this investigation was to further assess on-site subsurface quality in relation to the on-site dry cleaning operations. This objective was met by the performance of a geophysical survey and the collection and laboratory analysis of sediment, groundwater, and vapor samples.

During the geophysical survey, accessible areas grocery store tenant space basement were inspected and scanned. Sumps and floor drains were observed connected to municipal sewer. Additionally, dry cleaning machine support posts were observed adjacent to the main sump pit. Two direct discharge drywells were observed in the rear parking lot area.

Two sediment samples were collected from the drywells. Sediment analytical results reported concentrations of toluene above Unrestricted Use and Restricted Residential Use SCOs at 130,000 ug/kg in UIC02. Acetone was reported above Unrestricted Use SCOS, but below Restricted Residential Use SCOs in both UIC01 and UIC02 at 180 ug/kg and 1,100 ug/kg, respectively. Methyl ethyl ketone was reported above Unrestricted Use SCOS, but below Restricted Residential Use SCOs in UIC02 at 1,900 ug/kg.

Two soil borings were advanced, and two groundwater samples collected for laboratory analysis. Groundwater analytical results reported concentrations of one VOC, PCE slightly above AWQS in both groundwater samples analyzed at 9.9 ug/l in GW01 and 6.8 ug/l in GW02.

Four sub-slab vapor samples were collected, and laboratory analyzed for VOCs. Indoor air sample results from the previous investigation were compared with these sub-slab vapor results. The

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According to the NYSDOH soil vapor intrusion decision matrices, the recommended action for cis-1,2-dichloroethene, PCE, and TCE is to "Mitigate".

Analytical summary maps are included as Figures 4, 5, and 6. The report is included in Appendix A.

Remedial Investigation – February 2024

In February 2024, Castleton completed a Remedial Investigation. The objective of this investigation was to further assess on-site subsurface quality in relation to former on-site dry cleaning operations. This objective was met by the performance of a geophysical survey, monitoring well installation and survey, and the collection and laboratory analysis of sediment, groundwater, air and vapor samples.

During the geophysical survey, accessible areas of the basement beneath the grocery store and former dry cleaning tenant space were inspected and scanned. Sumps and floor drains were observed connected to municipal sewer. Additionally, dry cleaning machine support posts were observed adjacent to the main sump pit. Two direct discharge stormwater drywells were observed in the rear parking lot area.

Six monitoring wells were installed, developed, and surveyed. Two groundwater gauging and sampling events occurred in January and February 2024. Groundwater flows towards the southeast. PCE concentrations were observed in groundwater with the highest concentration at 9.4 ug/l in monitoring well MW01 located downgradient of the former dry cleaner. Elevated concentrations of chloromethane were observed during the second sampling event.

Sediment analytical results reported concentrations of VOCs, semi-volatile organic compounds (SVOCs), and metals in the two drywells sampled.

Two sub-slab vapor and five indoor air samples were collected and analyzed for VOCs. The concentration of PCE detected in one of the sub-slab samples (SSV02 at 1,380 ug/m^3) triggers the "mitigate" recommendation and one of the sub-slab concentrations (SSV01 at 594 ug/m^3) triggers the "monitor" recommendation in Matrix B of the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006).* However, the concentrations of PCE, as well as trichloroethene (TCE), and methylene chloride, that were collected from all five indoor air samples were reported below the NYSDOH Air Guidelines Values.

On February 26, 2024, NYSDEC was notified of the Remedial Investigation findings, and Spill # 2309256 was assigned. The DEC Spill project manager passed the file to the Division of Environmental Remediation due to the concentrations of chlorinated VOCs reported on site.

Analytical summary maps are included as Figures 7 and 8. The report is included in Appendix A.

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Chemical Removal Summary Letter – July 20, 2024

As per the Chemical Removal Summary Letter, dated July 30, 2024, included in Appendix A, the equipment, chemicals, and clothing were removed from the former dry cleaner tenant space in May 2024 to prepare the tenant space to be rented.

Drywell Remediation Summary Report – July 2024

Castleton completed the Drywell Remedial Summary report in July 2024, included in Appendix A. The scope of work to remediate the impacted structures consisted of removing liquid and soil from two (2) drywells (UIC01 and UIC02). Remedial activities were performed by PAL Environmental Services Inc. of Long Island City, New York, with direction and oversight provided by Castleton. Remedial efforts were conducted on June 11, 2024. 688 gallons of liquid were removed and properly disposed at Clean Waters of New York of Staten Island, New York. Approximately 1.91 tons of sediment were removed from the stormwater drywells and disposed of as non-hazardous waste at Dale Transfer Corporation of West Babylon, New York.

Soil and groundwater endpoint samples were collected from each structure to assess the effectiveness of the remedial effort.

Soil endpoint sample results reported concentrations of VOCs and SVOCs as non-detect or below applicable criteria. Soil analytical results reported concentration of one metal, chromium, above Unrestricted Use and Protection of Groundwater SCOs in drywell UIC01. All other metals were reported as non-detect or below Unrestricted Use and Protection of Groundwater SCOs.

Groundwater analytical results reported concentration of VOCs, SVOCs, and metals above applicable criteria.

Castleton concluded that soil remediation within the drywells has been completed to the extent possible. Castleton recommended that groundwater remedial actions be addressed under a separate cover.

An analytical summary map is included as Figure 9. The report is included in Appendix A.

Site Characterization Report dated May 2025 (Revised September 2025)

The scope of work for the site characterization (SC) included:

- A geophysical survey to determine sewer and drainage pathways and to clear locations of underground obstructions prior to intrusive activities commencing;
- Installation of additional groundwater monitoring wells to assess vertical groundwater quality;
- Groundwater sampling to assess post remedial effects on groundwater quality;
- A soil vapor intrusion (SVI) investigation to assess appropriate vapor mitigation measures.

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Areas of concern evaluated during the SC include:

1. VOCs concentrations within shallow groundwater downgradient of the former dry cleaner that slightly exceeded the applicable AWQS. Potential sources of chemicals have been removed from the property and are not currently being used. Groundwater is not utilized in the area of Brooklyn for potable purposes. Therefore, residual impacts to groundwater from PCE are present, but do not constitute a significant threat to human health and the environment.
2. Groundwater PFAS impacts were observed in each groundwater sample. The reported concentrations were ubiquitous across the site. Additionally, according to surrounding data from upgradient site 673 Livonia Avenue, Brooklyn, NY (site 224352), upgradient site Sutter Crossing (C224331) cross-gradient 749 Van Sinderen Avenue, Brooklyn, NY (site C224405), PFAS have been reported in groundwater at similar concentrations. This suggests that PFAS present can be attributed to overall groundwater quality in the region of Brooklyn and the PFAS detected at the site does not pose a significant threat to human health and the environment.
3. Concentrations of chromium in groundwater were limited to total and dissolved concentrations in one sample of the ten samples analyzed.
4. Metals concentrations of manganese, iron, and sodium in groundwater can be attributed to overall groundwater quality in this region of Brooklyn and these results do not constitute a significant threat to human health and the environment.
5. Dieldrin was reported above applicable criteria in two deep groundwater samples. This suggests that its presence is not from on-site sources. Additionally, since groundwater is not used for drinking, these results do not constitute a significant threat to human health and the environment.
6. A potential soil vapor intrusion concern is present for PCE and TCE. TCE was reported as non-detect in indoor air. PCE was reported well below AGVs in indoor air. Since this property is not used for residential, the likelihood of exposures that would significantly impact human health are low.

Figures 10 through 13 show sampling results. The Site Characterization Report dated Revision 1-September 2025 is included in Appendix A.

2.5 Areas of Concern

Areas of concern have been developed to describe the existing site information, contaminants of potential concern, and potentially affected media (soil, groundwater, soil vapor). Figures 4 through 9 shows sample location from previous investigations and remedial activities and the analytical results exceeding applicable regulatory criteria.

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Soil

Soil is not an area of concern since there is limited soil under the existing building and parking lot above groundwater. Sediment within the drywells located within the parking lot were previously remediated.

Groundwater

As discussed with NYSDEC, the remaining concern in groundwater is related to an exceedance of chromium in one monitoring well (MW03).

Soil Vapor Intrusion

As discussed with NYSDEC, additional investigation into an appropriate mitigation measure will be conducted by a Professional Engineer in concurrence with additional soil vapor sampling to assess potential off-site migration. A pilot test work plan to determine if a sub-slab depressurization system (SSDS) is feasible will be provided under a separate cover. The additional investigation is included in this work plan.

3.0 SUPPLEMENTAL SITE CHARACTERIZATION

The proposed scope of work for the supplemental site characterization (SSC) includes:

- A geophysical survey to clear locations of underground obstructions prior to intrusive activities commencing;
- Groundwater sampling to assess post remedial effects on groundwater quality;
- A soil vapor investigation to assess current on-site conditions and potential off-site migration and assist in evaluating appropriate vapor mitigation measures.

Castleton will conduct the SSC on behalf of the site owner Unidos ZR LLC. All SSC work will be overseen by a Qualified Environmental Professional (QEP) and/or a NYS Professional Geologist (PG). Contact information for the principal personnel for this project and the site owner is provided in Table 1. Resumes of project staff are included in Appendix B.

Proposed sample locations are shown on Figure 14.

3.1 Geophysical Survey

A geophysical survey will be performed to identify subsurface anomalies indicative of direct drainage structures, buried utilities, etc. to clear locations prior to intrusive activities commencing. The survey will consist of the use of several remote sensing techniques including a magnetometer survey to detect ferrous objects, ground penetrating radar survey (GPR) to detect changes in soil density, and a utility locating device to trace identified piping.

3.2 Groundwater Sampling

As discussed with NYSDEC, the following groundwater samples will be collected from the following locations:

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- DRYWELL01 (UIC01)
- DRYWELL02 (UIC02)
- Monitoring Well MW03
- Monitoring Well MW05

Temporary one inch diameter wells will be set within each drywell to a maximum depth of five feet below grade to assist with groundwater sampling.

At each well, the depth to the static water level and depth of the well will be measured with an interface probe to the nearest 1/100th of a foot. The potential presence of non-aqueous-phase liquid (NAPL) will also be assessed.

Groundwater sampling will be conducted using low-flow purging techniques as described in USEPA Low-Flow Minimal Groundwater Sampling Procedures dated April 1996.

A decontaminated low-flow pump equipped with dedicated HDPE tubing will be used to purge the well until the turbidity of the produced water is less than 50 NTU. Following the removal of each well volume, field parameters including pH, turbidity, DO, specific conductivity, and temperature, will be monitored and recorded. When all stability parameters vary by less than 10 percent between the removal of successive well volumes, the well will be sampled. Well sampling forms documenting the well purging and sampling procedures and measurements will be completed. Well purging water will be containerized for proper offsite disposal.

Groundwater samples will be submitted to a NYSDOH ELAP certified laboratory and analyzed for Hexavalent and Trivalent Chromium by USEPA Method 6010 (total and dissolved).

The analytical methods used for testing will be as per NYS Analytical Services Protocol (ASP) with Category B deliverables. Electronic data deliverables (EDDs) will be prepared and uploaded into the NYSDEC's environmental information management system.

Quality Assurance/Quality Control (QA/QC) samples, including blind duplicates and matrix spike (MS)/MS duplicates (MSD) will be collected at a rate of 1 per 20. Laboratory-provided trip blanks will be included in sample coolers containing VOC samples and analyzed for VOCs only. Disposable sampling equipment will be used to purge groundwater and collect representative samples from each well. The Quality Assurance Project Plan (QAPP) is included as Appendix C.

3.3 Soil Vapor Investigation

A soil vapor intrusion investigation will be conducted:

- Within the (3) commercial units (City Fresh Market, former Lily's Dry Cleaner, and Tex's Chicken & Burgers).

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- If access is granted, the two adjacent properties located at 653 Stanley Avenue and 675 Stanley Avenue; and
- Along Stanley Avenue at the southern portion of the property.

Sample locations shown on Figure 14. Sampling locations will be installed, and subsequent sampling will be performed in accordance with the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)* and subsequent updates.

Four (4) sub-slab vapor points will be installed within the (3) commercial units (City Fresh Market, former Lily's Dry Cleaner, and Tex's Chicken & Burgers). Two vapor points will be installed within the supermarket basement. One vapor point will be installed within the former dry cleaner basement. One vapor point will be installed within the restaurant basement.

The adjacent property owners will be contacted for permission to sample within the adjacent properties located at 653 Stanley Avenue and 675 Stanley Avenue. If access is granted, one vapor point will be installed within each space for a total of two (2) sub-slab vapor samples.

Each sub-slab vapor point will be set within two inches of the base of the building slab and set with a stainless steel screen and dedicated tubing. The vapor point will be sealed with an inert material (ie, bentonite, bee's wax) at the surface.

Four (4) permanent soil vapor points will be installed within the sidewalk along Stanley Avenue at the southern portion of the property. Two (2) permanent soil vapor points within the northern parking lot.

Soil vapor points will be installed at two feet above the water table and set with a stainless steel screen and dedicated tubing. The bottom one to two feet will be filled with a porous, inert backfill material and sealed with a two foot bentonite seal and permanent sample point at the surface. Each permanent vapor point will be set with a protective casing around the top of the probe tubing.

All vapor samples will be collected 24 hours after initial installation. Prior to sampling, each vapor sample point will be purged, screened with a photoionization detector (PID) for the presence of VOCs, and the integrity of the seal check using a tracer gas (helium) which will be measured in the field to ensure the seal is tight.

A total of twelve (12) vapor samples will be collected for laboratory analysis in laboratory certified 6-liter Summa canisters fitted with two (2) hour regulators to limit air flow to less than 0.2 liters/minute. One duplicate vapor sample will be collected for QA/QC purposes.

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Air/vapor samples will be submitted to a NYSDOH ELAP certified laboratory and analyzed for VOCs by USEPA Methods TO-15/TO-15 SIM.

The analytical methods used for testing will be as per NYS Analytical Services Protocol (ASP) with Category B deliverables. Electronic data deliverables (EDDs) will be prepared and uploaded into the NYSDEC's environmental information management system.

Quality Assurance/Quality Control (QA/QC) samples including blind duplicates will be collected at a rate of 1 per 20. The Quality Assurance Project Plan (QAPP) is included as Appendix C.

Draft results from the sampling events will be provided to NYSDEC and NYSDOH on receipt. Final results will be provided to NYSDEC and NYSDOH as part of the SSC Report.

3.4 Management of Investigation-Derived Waste

All groundwater that is generated during the SSC will be containerized for offsite disposal, transported by a licensed waste transporter and properly disposed offsite at permitted waste disposal facilities. Waste transport and disposal will be documented with manifests, copies of which will be included in the SSC Report.

3.5 Health and Safety Plan

A site-specific HASP is provided in Appendix D. The site-specific HASP provides guidance to maximize health and safety of on-site workers during SC specific tasks including media sampling, installation of wells, the SVI investigation, and other field related activities.

3.6 Community Air Monitoring

A Community Air Monitoring Plan (CAMP) that details procedures for air monitoring during intrusive activities is included in Appendix E.

3.7 Green and Sustainable Remediation

Actions to complete the supplemental site investigation work will be done to comply with NYSDEC DER-31 Green Remediation dated January 20, 2011.

Applicable actions to comply with DER-31 for this investigation include:

- Low Flow Groundwater Sampling to reduce the volume of purged groundwater to be disposed.
- Use of electric drilling equipment to install soil vapor sampling points
- Minimize drilling equipment idling

Additional actions will be implemented as identified during the investigation process.

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4.0 REPORTING AND SCHEDULE

NYSDEC and NYSDOH will be notified at least 7 days prior to mobilization to the site. Daily field reports will be submitted to the department while activity is occurring at the site. Additionally, monthly progress reports will be submitted during the preparation of the SSC Report.

The SSC Report will be prepared in accordance with NYSDEC DER-10 and will include updated site plans showing sample locations and other pertinent information, a description of the work performed, the resulting chemical analytical data, an interpretation of the data, and conclusions and recommendations.

Groundwater results will be compared to the NYSDEC Class GA Ambient Water Quality Standards and Guidance Values. The soil vapor data will be evaluated with respect to NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)* and subsequent updates.

Copies of the complete laboratory analytical packages will be provided separately from the Report as an electronic submission, in accordance with DER-10.

The following schedule is anticipated to complete this scope of work:

Task	Duration	Anticipated Completion Date
NYSDEC approval of Supplemental Site Characterization Work Plan	30 Days	December 1, 2025
Soil Vapor Investigation	2-3 days	December 31, 2025
Groundwater Sampling	1-2 days	December 31, 2025
Data Review, DUSR Preparation and Supplemental Site Characterization Report submittal	30 Days	February 1, 2025
NYSDEC Review	60 Days	March 31, 2025

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FIGURES

TABLES

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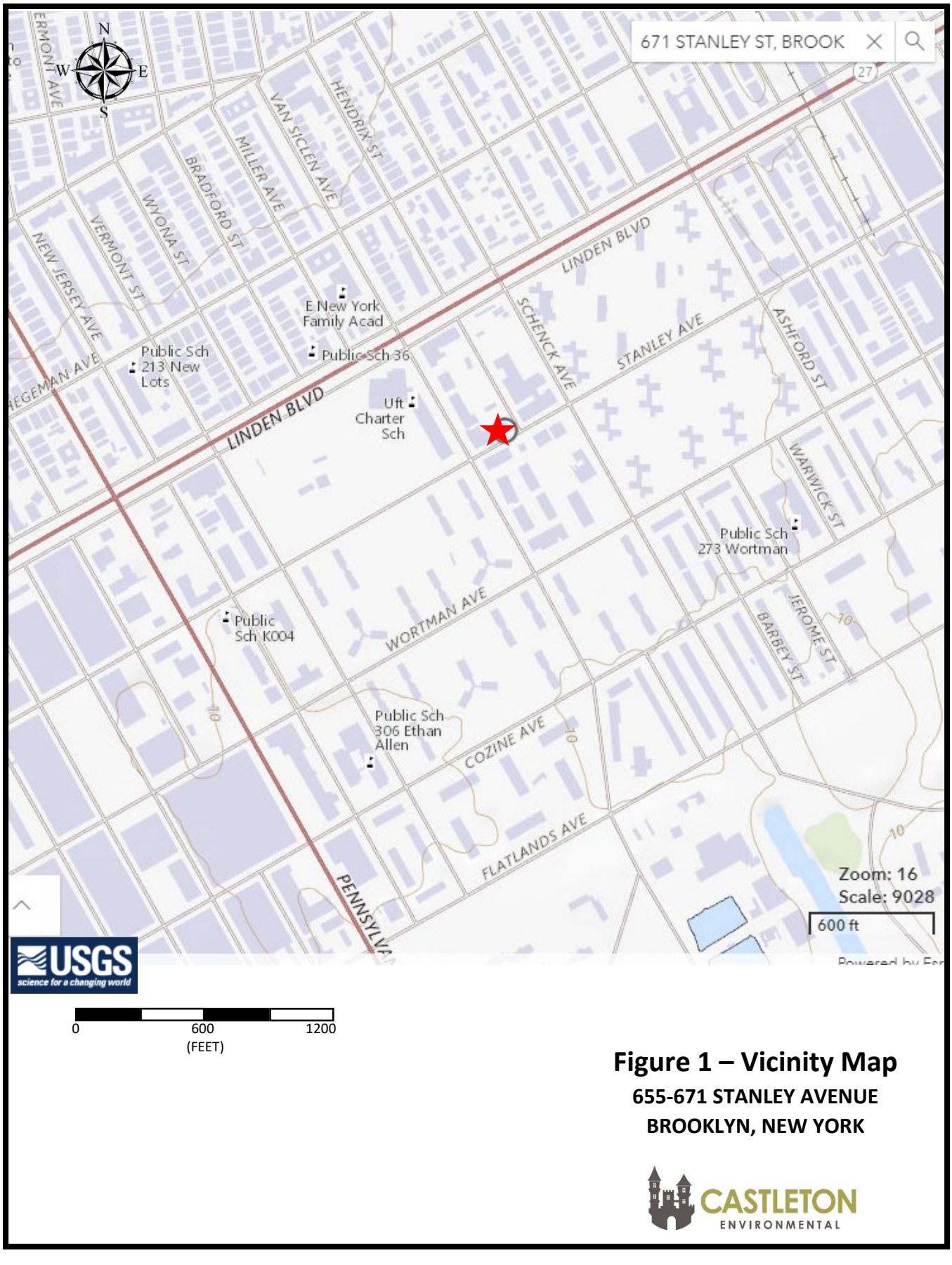
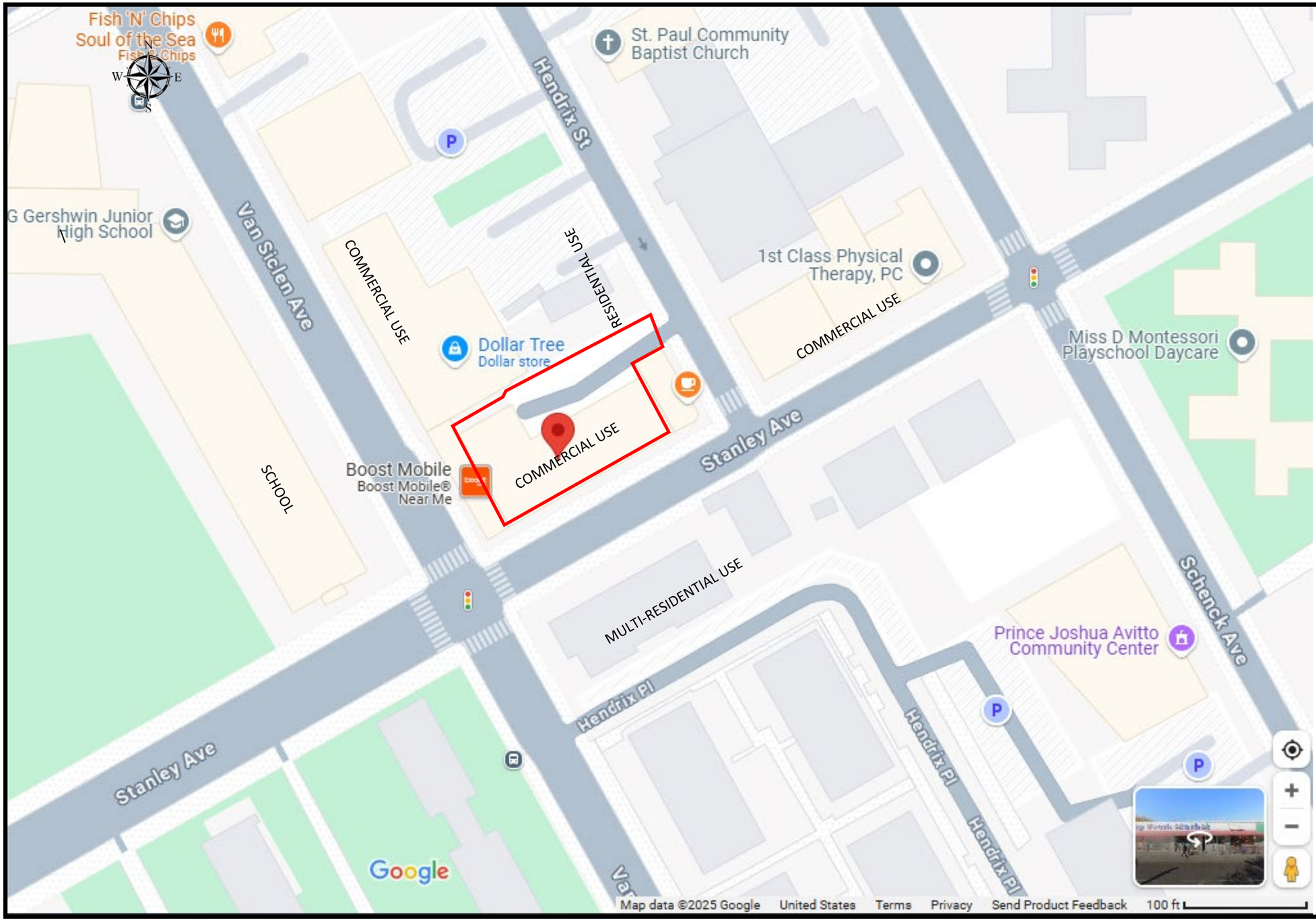


Figure 1 – Vicinity Map

655-671 STANLEY AVENUE

BROOKLYN, NEW YORK

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LEGEND

SITE BOUNDARY

Figure 2
LAND USED AND SENSITIVE RECEPTOR MAP

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

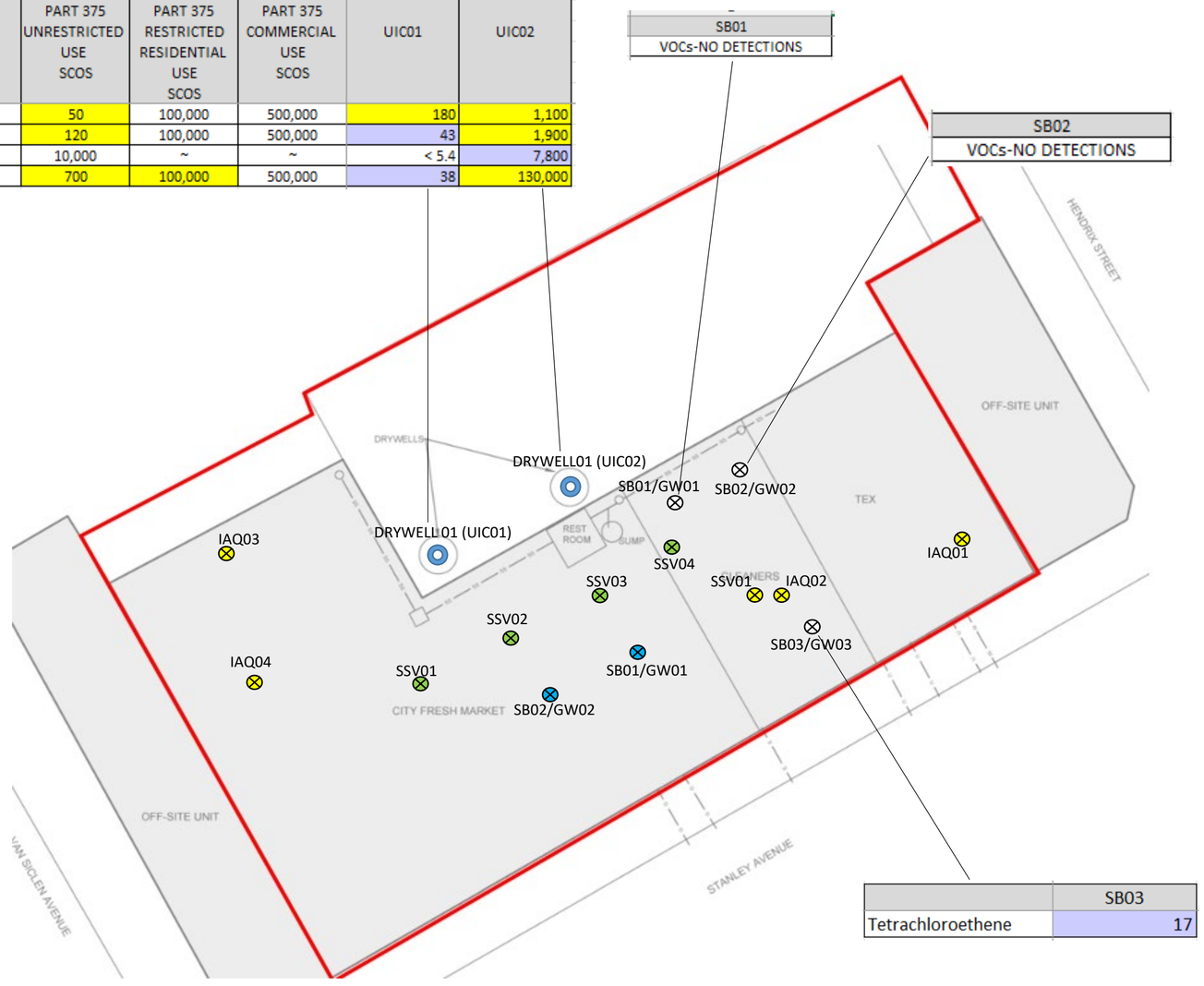
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Figure 3
SITE PLAN

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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	NYSDEC PART 375 UNRESTRICTED USE SCOS	NYSDEC PART 375 RESTRICTED RESIDENTIAL USE SCOS	NYSDEC PART 375 COMMERCIAL USE SCOS	UIC01	UIC02
Acetone	50	100,000	500,000	180	1,100
Methyl Ethyl Ketone	120	100,000	500,000	43	1,900
p-Isopropyltoluene	10,000	~	~	< 5.4	7,800
Toluene	700	100,000	500,000	38	130,000



	SB03
Tetrachloroethene	17

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

All results reported in ug/kg.

Yellow highlight shows exceedance of applicable criteria.

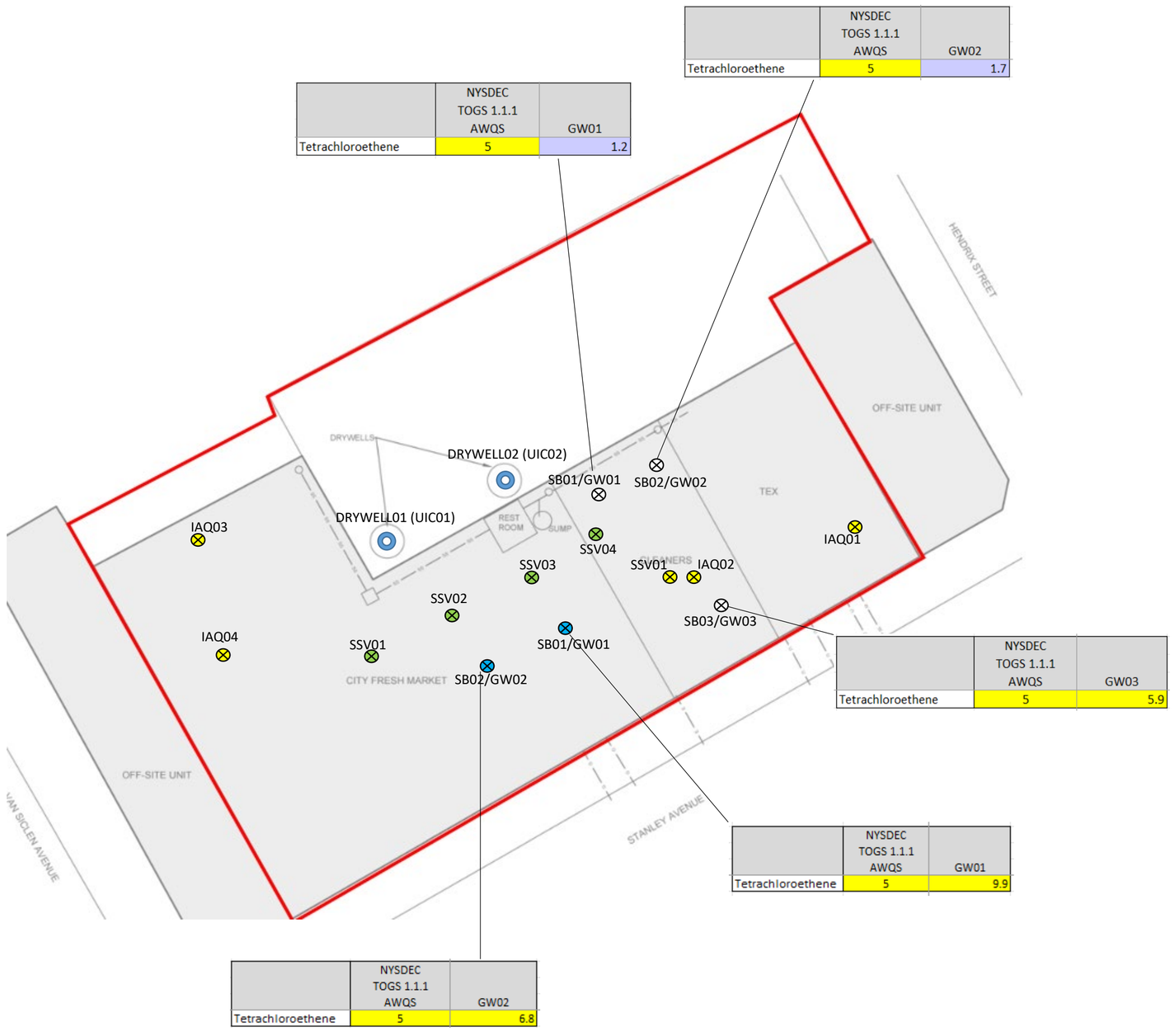
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 4
SOIL ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	NYSDEC TOGS 1.1.1 AWQS	GW01
Tetrachloroethene	5	1.2

	NYSDEC TOGS 1.1.1 AWQS	GW02
Tetrachloroethene	5	1.7

	NYSDEC TOGS 1.1.1 AWQS	GW03
Tetrachloroethene	5	5.9

	NYSDEC TOGS 1.1.1 AWQS	GW01
Tetrachloroethene	5	9.9

	NYSDEC TOGS 1.1.1 AWQS	GW02
Tetrachloroethene	5	6.8

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

All results reported in ug/l.

Yellow highlight shows exceedance of applicable criteria.

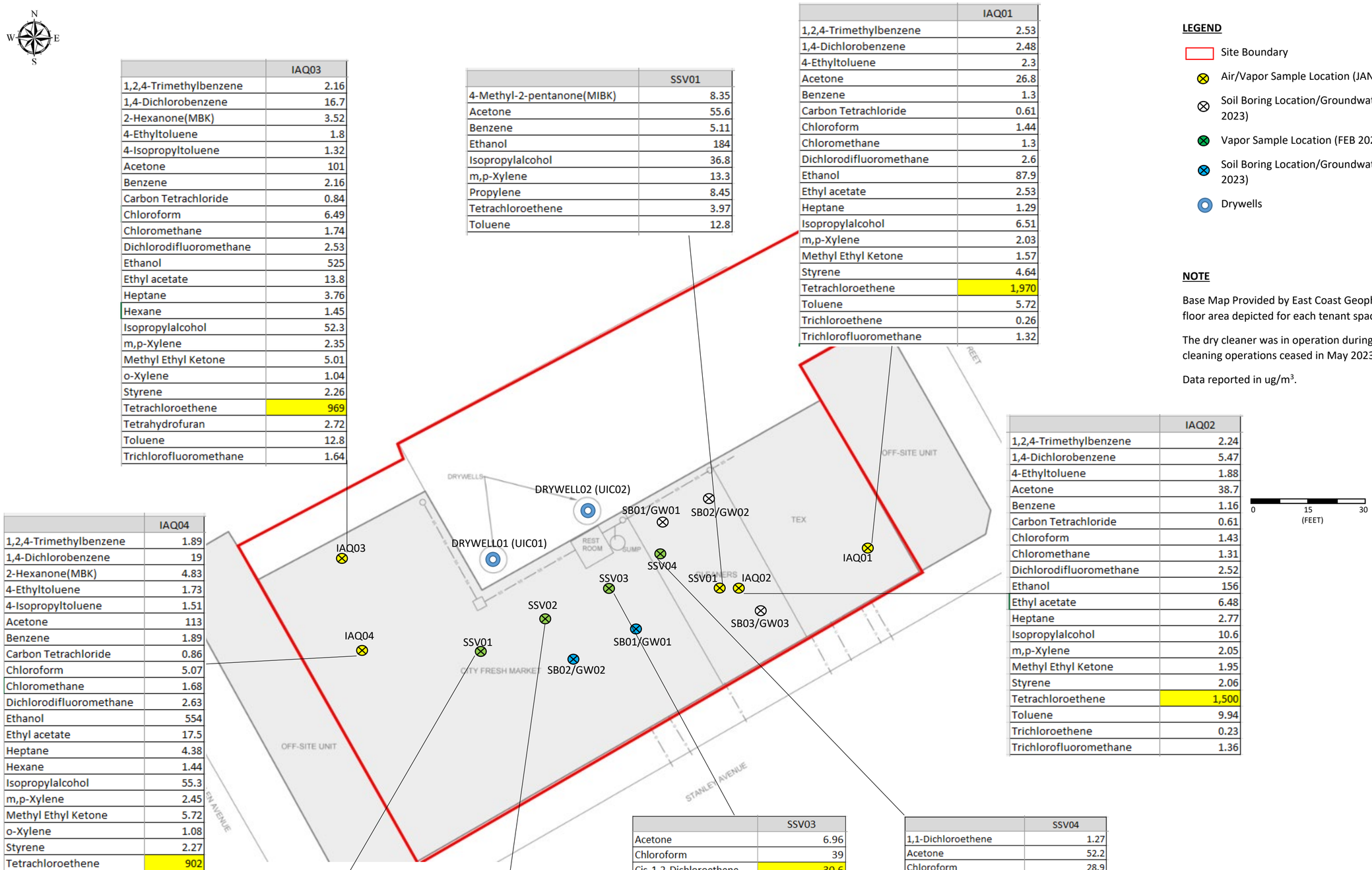
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 5
GROUNDWATER ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	IAQ03
1,2,4-Trimethylbenzene	2.16
1,4-Dichlorobenzene	16.7
2-Hexanone(MBK)	3.52
4-Ethyltoluene	1.8
4-Isopropyltoluene	1.32
Acetone	101
Benzene	2.16
Carbon Tetrachloride	0.84
Chloroform	6.49
Chloromethane	1.74
Dichlorodifluoromethane	2.53
Ethanol	525
Ethyl acetate	13.8
Heptane	3.76
Hexane	1.45
Isopropylalcohol	52.3
m,p-Xylene	2.35
Methyl Ethyl Ketone	5.01
o-Xylene	1.04
Styrene	2.26
Tetrachloroethene	969
Tetrahydrofuran	2.72
Toluene	12.8
Trichlorofluoromethane	1.64

	SSV01
4-Methyl-2-pentanone(MIBK)	8.35
Acetone	55.6
Benzene	5.11
Ethanol	184
Isopropylalcohol	36.8
m,p-Xylene	13.3
Propylene	8.45
Tetrachloroethene	3.97
Toluene	12.8

	IAQ01
1,2,4-Trimethylbenzene	2.53
1,4-Dichlorobenzene	2.48
4-Ethyltoluene	2.3
Acetone	26.8
Benzene	1.3
Carbon Tetrachloride	0.61
Chloroform	1.44
Chloromethane	1.3
Dichlorodifluoromethane	2.6
Ethanol	87.9
Ethyl acetate	2.53
Heptane	1.29
Isopropylalcohol	6.51
m,p-Xylene	2.03
Methyl Ethyl Ketone	1.57
Styrene	4.64
Tetrachloroethene	1,970
Toluene	5.72
Trichloroethene	0.26
Trichlorofluoromethane	1.32

	IAQ04
1,2,4-Trimethylbenzene	1.89
1,4-Dichlorobenzene	19
2-Hexanone(MBK)	4.83
4-Ethyltoluene	1.73
4-Isopropyltoluene	1.51
Acetone	113
Benzene	1.89
Carbon Tetrachloride	0.86
Chloroform	5.07
Chloromethane	1.68
Dichlorodifluoromethane	2.63
Ethanol	554
Ethyl acetate	17.5
Heptane	4.38
Hexane	1.44
Isopropylalcohol	55.3
m,p-Xylene	2.45
Methyl Ethyl Ketone	5.72
o-Xylene	1.08
Styrene	2.27
Tetrachloroethene	902
Tetrahydrofuran	3.12
Toluene	14.6
Trichlorofluoromethane	1.61

	IAQ02
1,2,4-Trimethylbenzene	2.24
1,4-Dichlorobenzene	5.47
4-Ethyltoluene	1.88
Acetone	38.7
Benzene	1.16
Carbon Tetrachloride	0.61
Chloroform	1.43
Chloromethane	1.31
Dichlorodifluoromethane	2.52
Ethanol	156
Ethyl acetate	6.48
Heptane	2.77
Isopropylalcohol	10.6
m,p-Xylene	2.05
Methyl Ethyl Ketone	1.95
Styrene	2.06
Tetrachloroethene	1,500
Toluene	9.94
Trichloroethene	0.23
Trichlorofluoromethane	1.36

	SSV01
Acetone	52.7
Chloroform	43
Ethanol	6.03
Methyl Ethyl Ketone	13.9
Tetrachloroethene	718
Trichloroethene	13.2

	SSV02
Cis-1,2-Dichloroethene	1.03
Ethanol	7.4
Tetrachloroethene	1,340
Toluene	6.36
Trichloroethene	114

	SSV03
Acetone	6.96
Chloroform	39
Cis-1,2-Dichloroethene	30.6
Ethanol	28.4
Isopropylalcohol	5.13
Tetrachloroethene	3,240
Trichloroethene	305

	SSV04
1,1-Dichloroethene	1.27
Acetone	52.2
Chloroform	28.9
Cis-1,2-Dichloroethene	83.2
Ethanol	8
Methyl Ethyl Ketone	5.87
Tetrachloroethene	2,290
Toluene	5.12
Trichloroethene	168

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

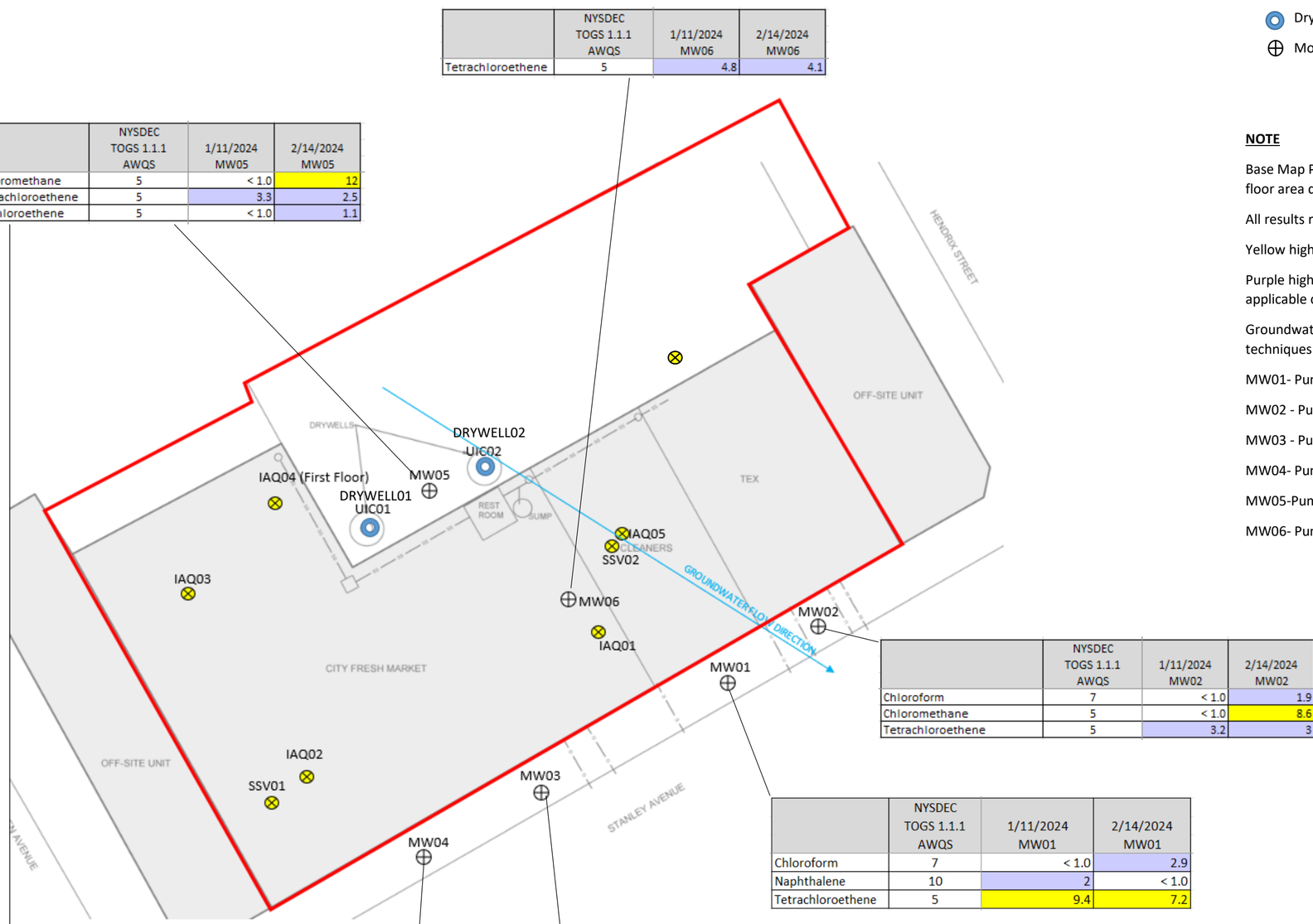
Data reported in ug/m^3.

0 15 30
(FEET)

Figure 6
AIR/VAPOR ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW06	2/14/2024 MW06
Tetrachloroethene	5	4.8	4.1

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW05	2/14/2024 MW05
Chloromethane	5	< 1.0	12
Tetrachloroethene	5	3.3	2.5
Trichloroethene	5	< 1.0	1.1

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW02	2/14/2024 MW02
Chloroform	7	< 1.0	1.9
Chloromethane	5	< 1.0	8.6
Tetrachloroethene	5	3.2	3

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW01	2/14/2024 MW01
Chloroform	7	< 1.0	2.9
Naphthalene	10	2	< 1.0
Tetrachloroethene	5	9.4	7.2

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW04	2/14/2024 MW04
Chloroform	7	6.8	5.9
Chloromethane	5	< 1.0	26
Tetrachloroethene	5	3.5	5.7

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW03	2/14/2024 MW03
Chloroform	7	5.2	5
Tetrachloroethene	5	2.6	2.2

0 15 30
(FEET)

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

All results reported in ug/l.

Yellow highlight shows exceedance of applicable criteria.

Purple highlight shows detection of a compound below applicable criteria.

Groundwater sampling was conducted using low-flow purging techniques.

MW01- Pump intake set at 15 feet below grade.

MW02 - Pump intake set at 15.5 feet below grade.

MW03 - Pump intake set at 15.5 feet below grade.

MW04- Pump intake set at 16 feet below grade.

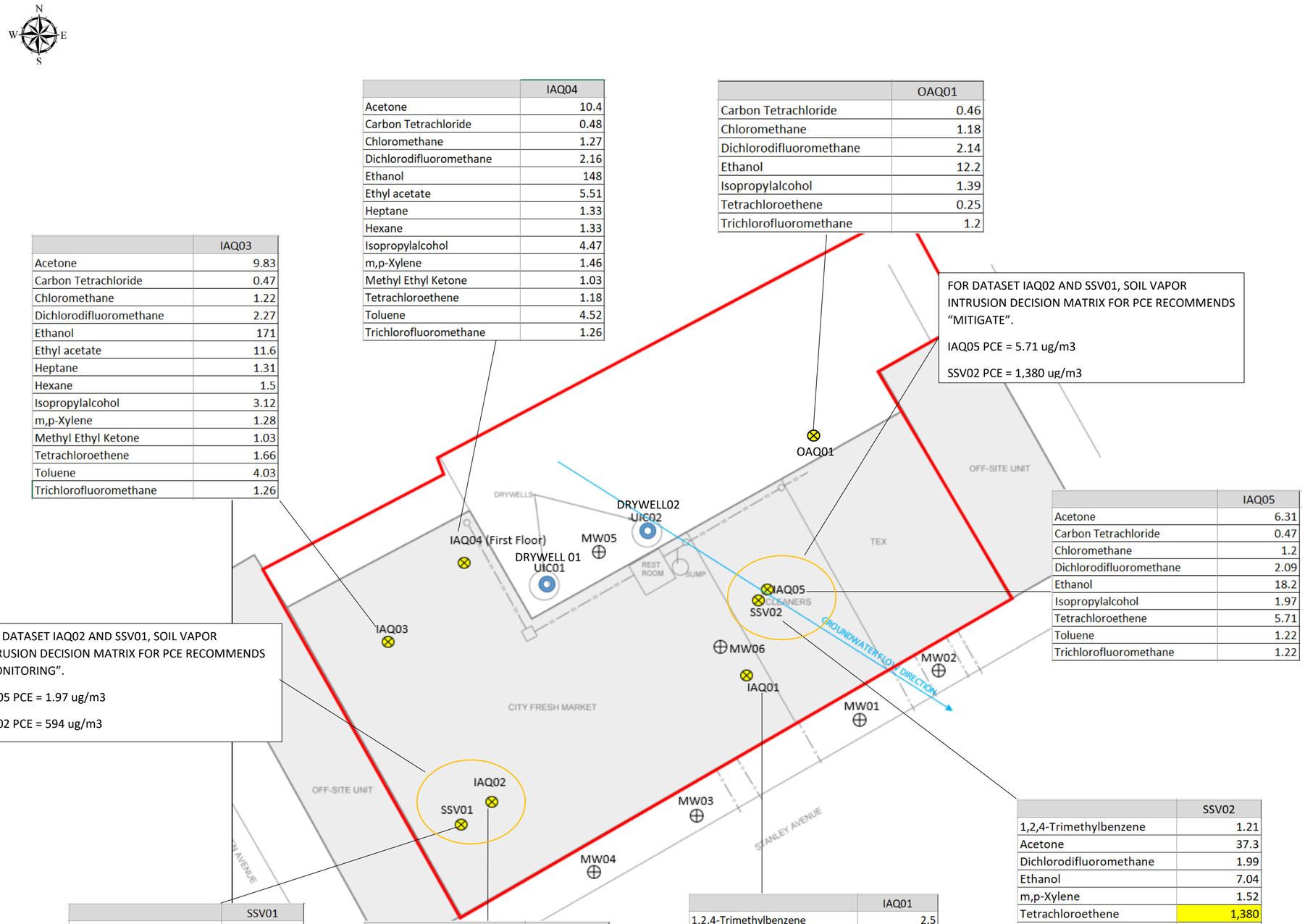
MW05-Pump intake set at 8 feet below grade.

MW06- Pump intake set at 2.5 feet below grade.

Figure 7
ANALYTICAL RESULTS-GROUNDWATER
JANUARY/FERBUARY 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	IAQ04
Acetone	10.4
Carbon Tetrachloride	0.48
Chloromethane	1.27
Dichlorodifluoromethane	2.16
Ethanol	148
Ethyl acetate	5.51
Heptane	1.33
Hexane	1.33
Isopropylalcohol	4.47
m,p-Xylene	1.46
Methyl Ethyl Ketone	1.03
Tetrachloroethene	1.18
Toluene	4.52
Trichlorofluoromethane	1.26

	OAQ01
Carbon Tetrachloride	0.46
Chloromethane	1.18
Dichlorodifluoromethane	2.14
Ethanol	12.2
Isopropylalcohol	1.39
Tetrachloroethene	0.25
Trichlorofluoromethane	1.2

FOR DATASET IAQ02 AND SSV01, SOIL VAPOR INTRUSION DECISION MATRIX FOR PCE RECOMMENDS "MITIGATE".

IAQ05 PCE = 5.71 ug/m3

SSV02 PCE = 1,380 ug/m3

	IAQ03
Acetone	9.83
Carbon Tetrachloride	0.47
Chloromethane	1.22
Dichlorodifluoromethane	2.27
Ethanol	171
Ethyl acetate	11.6
Heptane	1.31
Hexane	1.5
Isopropylalcohol	3.12
m,p-Xylene	1.28
Methyl Ethyl Ketone	1.03
Tetrachloroethene	1.66
Toluene	4.03
Trichlorofluoromethane	1.26

	IAQ05
Acetone	6.31
Carbon Tetrachloride	0.47
Chloromethane	1.2
Dichlorodifluoromethane	2.09
Ethanol	18.2
Isopropylalcohol	1.97
Tetrachloroethene	5.71
Toluene	1.22
Trichlorofluoromethane	1.22

FOR DATASET IAQ02 AND SSV01, SOIL VAPOR INTRUSION DECISION MATRIX FOR PCE RECOMMENDS "MONITORING".

IAQ05 PCE = 1.97 ug/m3

SSV02 PCE = 594 ug/m3

	SSV02
1,2,4-Trimethylbenzene	1.21
Acetone	37.3
Dichlorodifluoromethane	1.99
Ethanol	7.04
m,p-Xylene	1.52
Tetrachloroethene	1,380
Toluene	1.7
Trichloroethene	7.84
Trichlorofluoromethane	1.33

	SSV01
1,1,1-Trichloroethane	2.85
1,2,4-Trimethylbenzene	1.66
Acetone	11.3
Chloroform	146
Chloromethane	2.97
Dichlorodifluoromethane	3.43
Ethanol	5.65
Heptane	2.67
Isopropylalcohol	78.1
m,p-Xylene	2.77
o-Xylene	1.56
Tetrachloroethene	594
Toluene	2.18
Trichloroethene	4.09
Trichlorofluoromethane	1.68

	IAQ02
1,2,4-Trimethylbenzene	1.23
Acetone	10.9
Carbon Tetrachloride	0.47
Chloromethane	1.26
Dichlorodifluoromethane	2.04
Ethanol	176
Ethyl acetate	5.65
Heptane	2.06
Hexane	1.36
Isopropylalcohol	3.76
m,p-Xylene	1.68
Methyl Ethyl Ketone	1.67
Tetrachloroethene	1.97
Toluene	7.01
Trichlorofluoromethane	1.26

	IAQ01
1,2,4-Trimethylbenzene	2.5
Acetone	12.3
Carbon Tetrachloride	0.48
Chloromethane	1.25
Dichlorodifluoromethane	2.2
Ethanol	205
Ethyl acetate	4.68
Heptane	3.58
Isopropylalcohol	4.72
m,p-Xylene	1.95
Methyl Ethyl Ketone	1.69
Tetrachloroethene	4.79
Tetrahydrofuran	1.54
Toluene	13.5
Trichlorofluoromethane	1.26

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

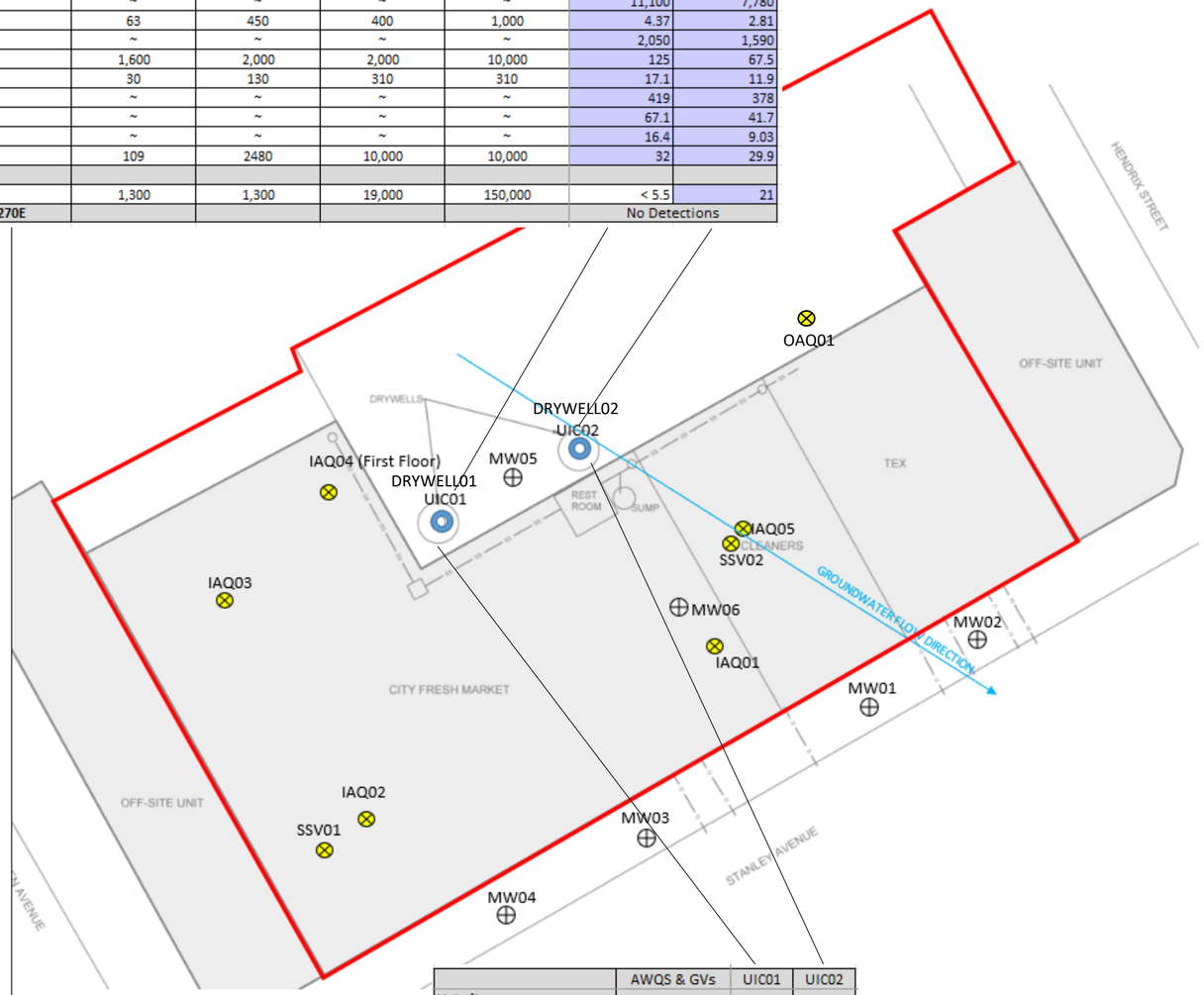
0 15 30
(FEET)

Figure 8
ANALYTICAL RESULTS-AIR AND VAPOR JANUARY 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL

Project Id : ZDEZ2402	NYSDEC PART 375 UNRESTRICTED USE SCOS	NYSDEC PART 375 PROTECTION OF GROUNDWATER SCOS	NYSDEC PART 375 RESTRICTED RESIDENTIAL USE SCOS	NYSDEC PART 375 COMMERCIAL USE SCOS	UIC01 Soil Result	UIC02 Soil Result
Metals						
Aluminum	~	~	~	~	3,690	3,100
Arsenic	13	16	16	16	2.3	< 0.93
Barium	350	820	400	400	10	10
Calcium	~	~	~	~	435	402
Chromium	1/30	19/NS	110/180	400/1500	40.8	14.5
Cobalt	~	~	~	~	3.77	3.46
Copper	50	1720	270	270	8.7	5.9
Iron	~	~	~	~	11,100	7,780
Lead	63	450	400	1,000	4.37	2.81
Magnesium	~	~	~	~	2,050	1,590
Manganese	1,600	2,000	2,000	10,000	125	67.5
Nickel	30	130	310	310	17.1	11.9
Potassium	~	~	~	~	419	378
Sodium	~	~	~	~	67.1	41.7
Vanadium	~	~	~	~	16.4	9.03
Zinc	109	2480	10,000	10,000	32	29.9
Volatiles By SW8260D						
Tetrachloroethene	1,300	1,300	19,000	150,000	< 5.5	21
Semivolatiles By SW8270E					No Detections	



	AWQS & GVs	UIC01	UIC02
Volatiles			
Methyl ethyl ketone	50	< 5.0	82
Tetrachloroethene	5	11	2.1
Semivolatiles			
Benz(a)anthracene	0.002	0.02	< 0.02
Benzo(a)pyrene	0.002	0.05	0.02
Benzo(b)fluoranthene	0.002	0.03	< 0.02
Benzo(k)fluoranthene	0.002	0.02	< 0.02
Indeno(1,2,3-cd)pyrene	0.002	0.04	0.02
Metals,			
Aluminum	0.1	3.83	0.753
Cadmium	0.005	0.011	0.001
Chromium	0.05	0.382	0.004
Iron	0.3	11.9	6.68
Sodium	20	35.3	12.9
Metals			
Iron (Dissolved)	0.3	0.013	2.64
Sodium (Dissolved)	20	32.1	11.4

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

Groundwater results reported in ug/l.

Soil results reported in ug/kg.

Yellow highlight shows exceedance of applicable criteria.

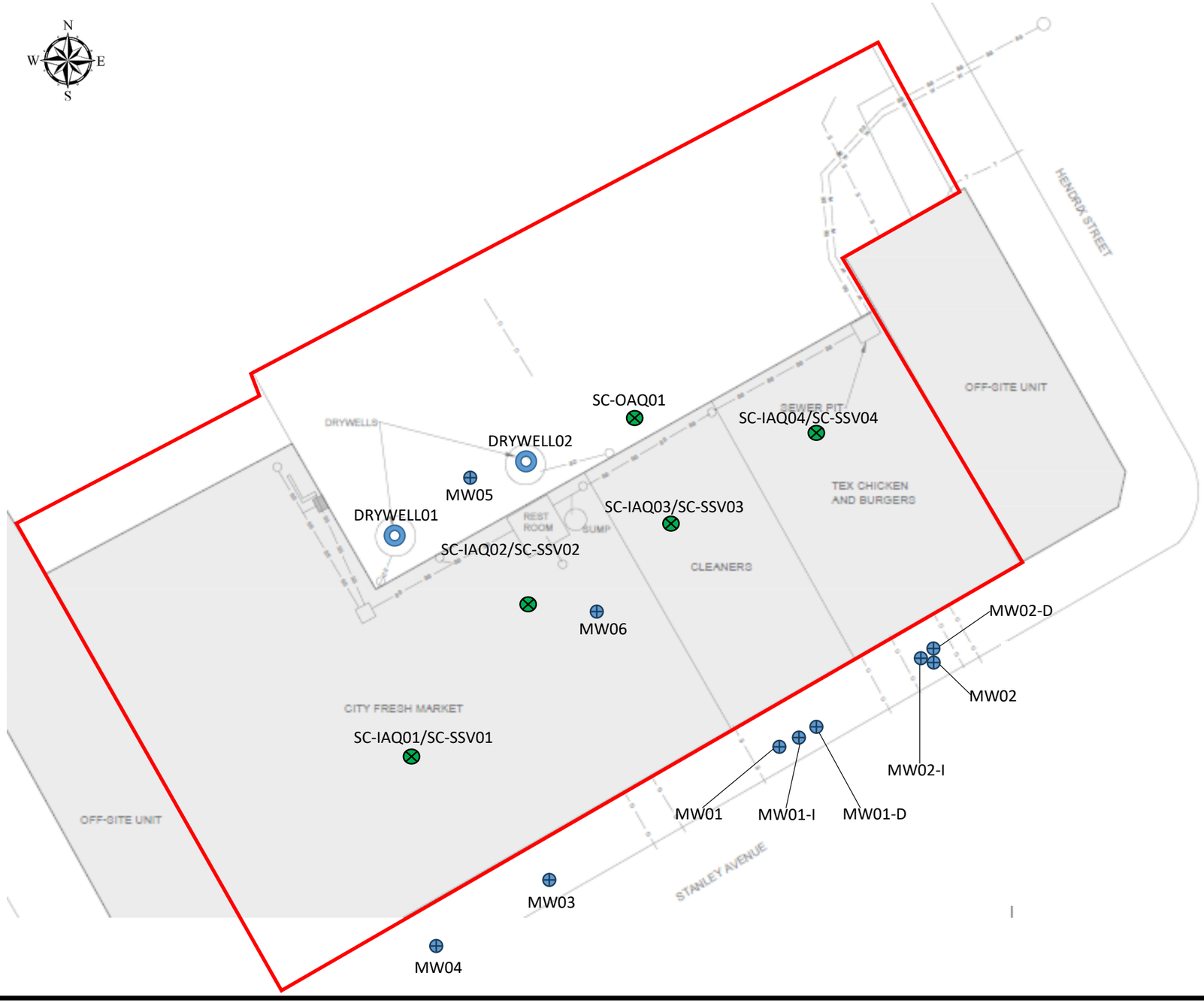
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 9
ANALYTICAL RESULTS-DRYWELL ENDPOINTS
JUNE 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

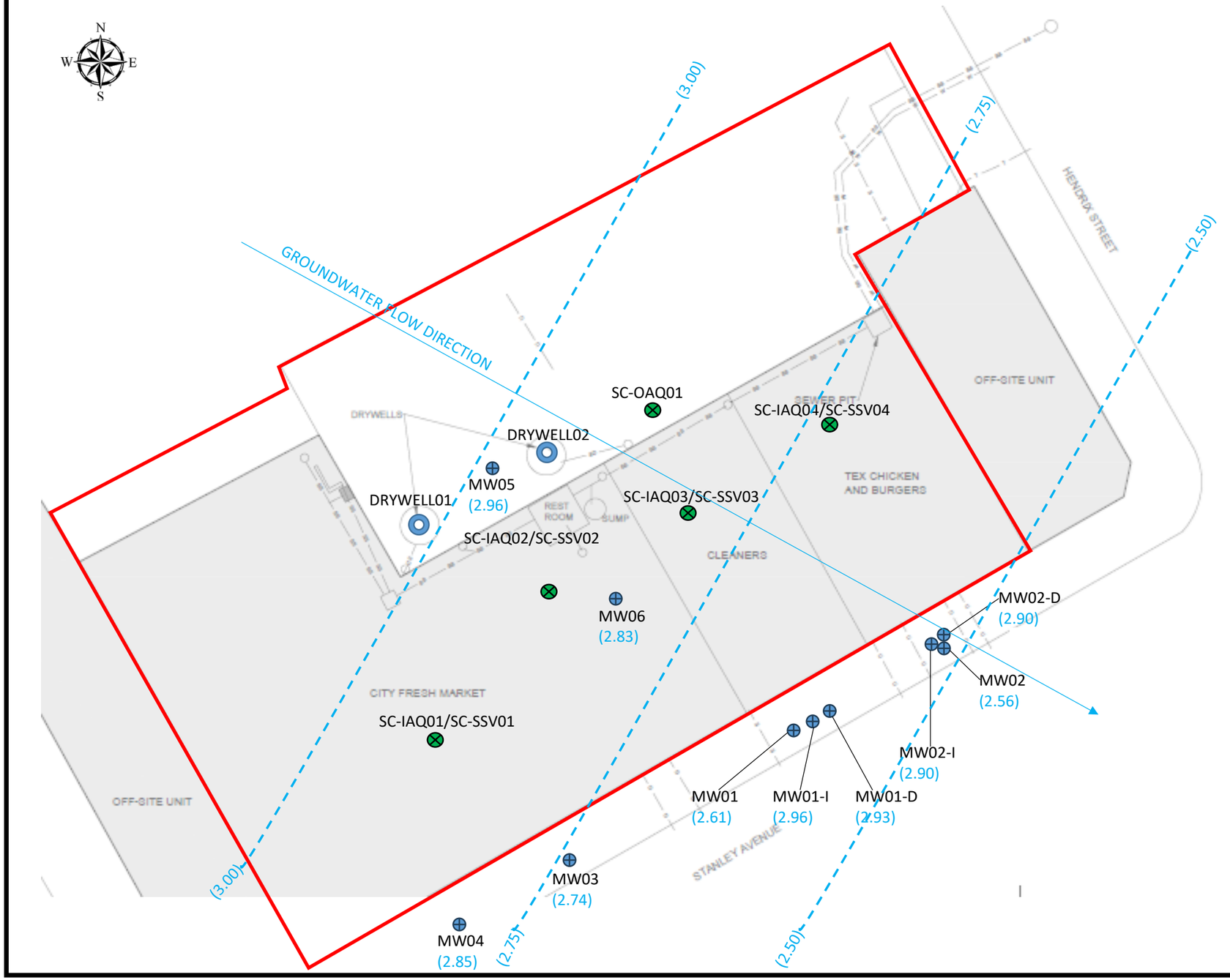
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 10
SAMPLE LOCATION MAP

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations
- (2.93) Groundwater Elevations- April 7 & 8, 2025

NOTE

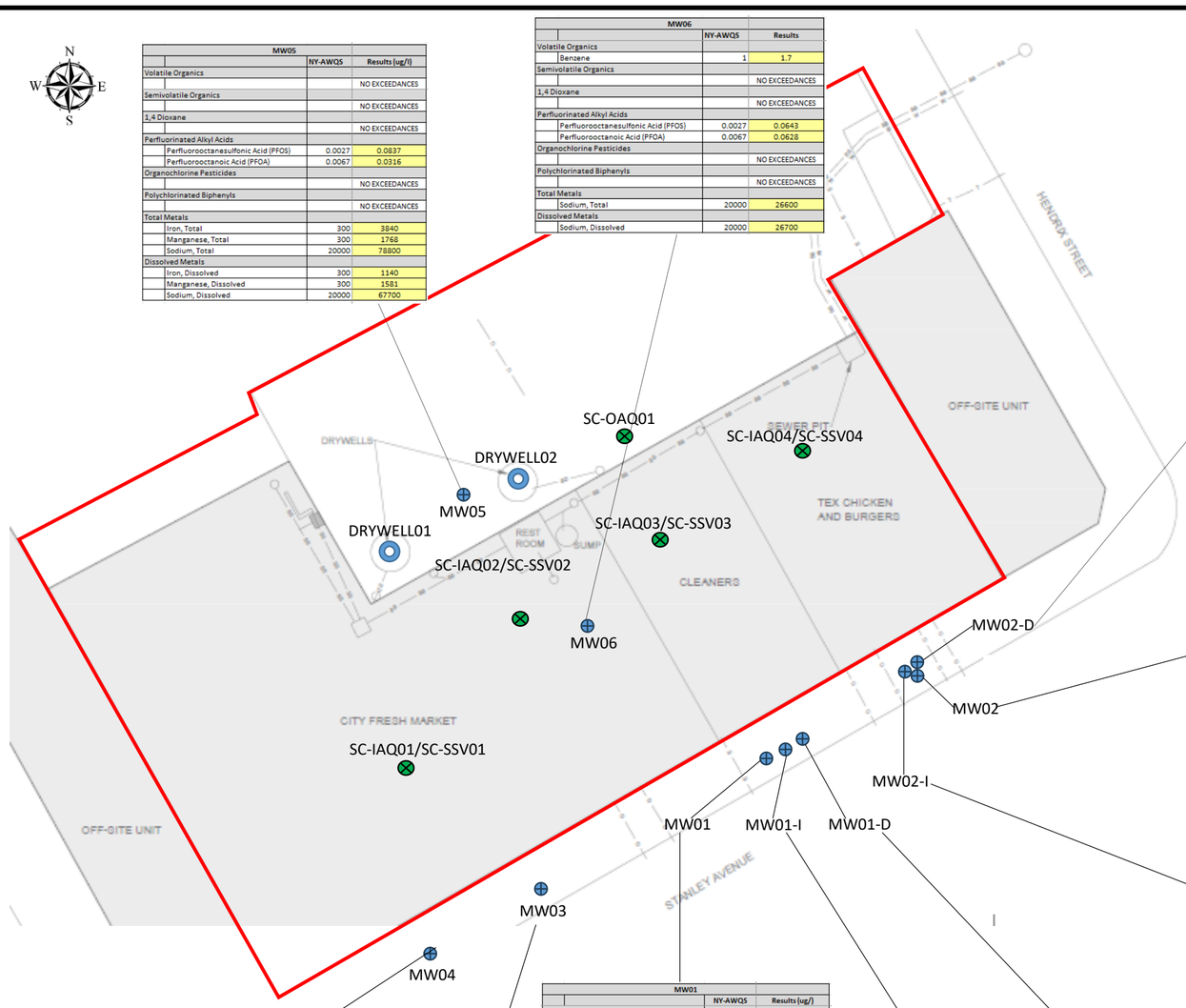
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 11
GROUNDWATER CONTOUR MAP SHALLOW - APRIL 2025

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



MW05		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0837
Perfluorooctanoic Acid (PFOA)	0.0067	0.0316
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	3840
Manganese, Total	300	1768
Sodium, Total	20000	78800
Dissolved Metals		
Iron, Dissolved	300	1140
Manganese, Dissolved	300	1581
Sodium, Dissolved	20000	67700

MW06		
	NY-AWQS	Results
Volatile Organics		
Benzene	1	1.7
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0643
Perfluorooctanoic Acid (PFOA)	0.0067	0.0628
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Sodium, Total	20000	26600
Dissolved Metals		
Sodium, Dissolved	20000	26700

MW02-D		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0242
Perfluorooctanoic Acid (PFOA)	0.0067	0.0578
Organochlorine Pesticides		
Dieldrin	0.004	0.006J
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	306
Manganese, Total	300	739.4
Sodium, Total	20000	143000
Dissolved Metals		
Manganese, Dissolved	300	792.8
Sodium, Dissolved	20000	143000

MW02		
	NY-AWQS	Results
Volatile Organics		
Tetrachloroethene	5	5.4
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0317
Perfluorooctanoic Acid (PFOA)	0.0067	0.0621
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Manganese, Total	300	812.9
Sodium, Total	20000	31100
Dissolved Metals		
Manganese, Dissolved	300	713.4
Sodium, Dissolved	20000	29400

MW02-I		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.03J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0206
Perfluorooctanoic Acid (PFOA)	0.0067	0.0526
Organochlorine Pesticides		
Dieldrin	0.004	0.011J
Polychlorinated Biphenyls by GC		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	433
Manganese, Total	300	316.8
Sodium, Total	20000	115000
Dissolved Metals		
Manganese, Dissolved	300	314.4
Sodium, Dissolved	20000	115000

MW01		
	NY-AWQS	Results (ug/)
Volatile Organics		
Tetrachloroethene	5	9.2
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0541
Perfluorooctanoic Acid (PFOA)	0.0067	0.054
Organochlorine Pesticides b		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Manganese, Total	300	909.3
Sodium, Total	20000	21100
Dissolved Metals		
Manganese, Dissolved	300	799.3

MW01-I		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.028
Perfluorooctanoic Acid (PFOA)	0.0067	0.0624
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	439
Manganese, Total	300	322.5
Sodium, Total	20000	91100
Dissolved Metals		
Sodium, Dissolved	20000	95500

MW01-D		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.04J
Hexachlorobenzene	0.04	0.06J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.019
Perfluorooctanoic Acid (PFOA)	0.0067	0.0571
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	539
Manganese, Total	300	610.7
Sodium, Total	20000	94100
Dissolved Metals		
Manganese, Dissolved	300	598.4
Sodium, Dissolved	20000	92000

MW04		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Organochlorine Pesticides		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0377
Perfluorooctanoic Acid (PFOA)	0.0067	0.0459
Polychlorinated Biphenyls by GC		
		NO EXCEEDANCES
Total Metals		
Sodium, Total	20000	71100
Dissolved Metals		
Sodium, Dissolved	20000	73400

MW03		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.03J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0279
Perfluorooctanoic Acid (PFOA)	0.0067	0.0343
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Chromium, Total	50	98.94
Sodium, Total	20000	38700
Dissolved Metals		
Chromium, Dissolved	50	104.4
Sodium, Dissolved	20000	39100

LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

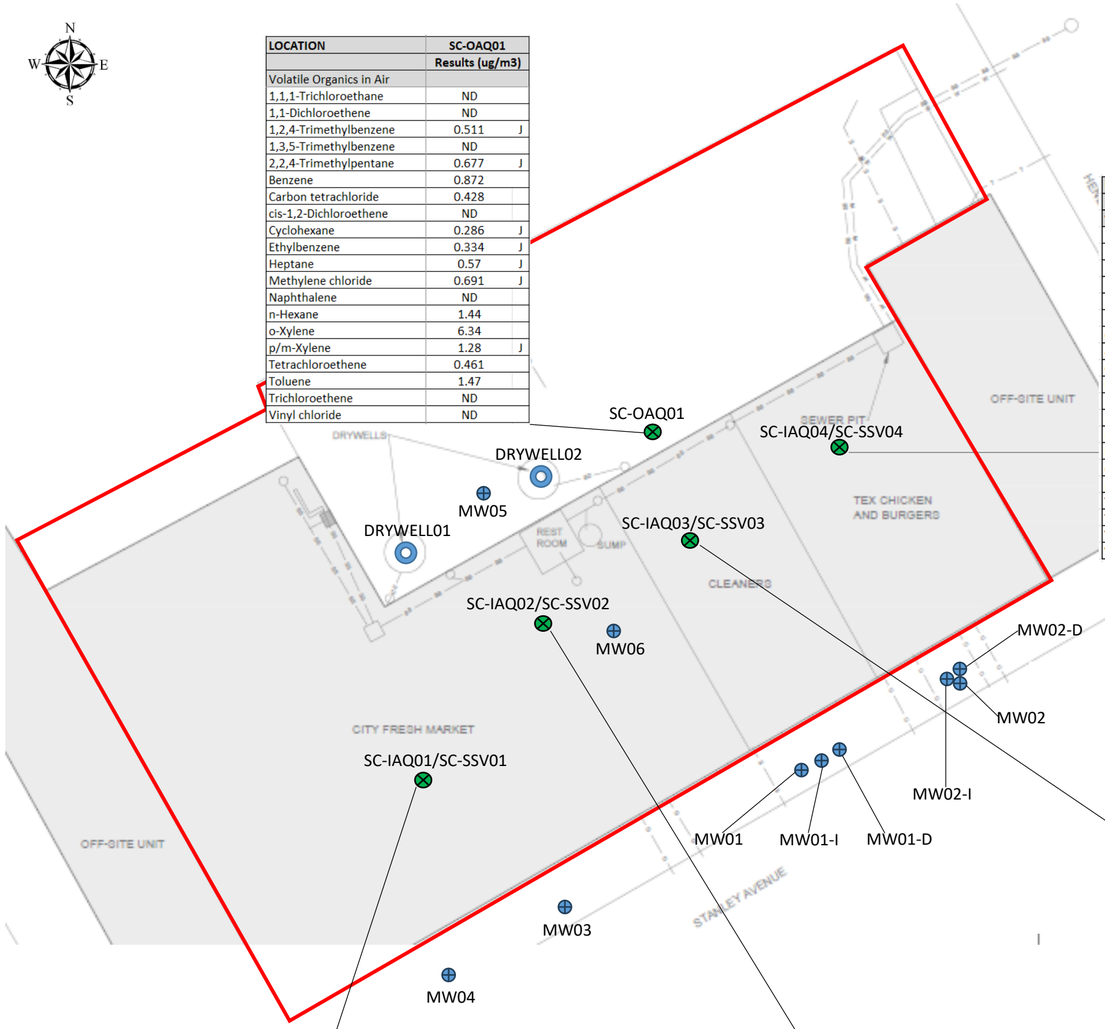
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

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Figure 12
GROUNDWATER ANALYTICAL EXCEEDANCES

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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LOCATION	SC-OAQ01	
	Results (ug/m3)	
Volatile Organics in Air		
1,1,1-Trichloroethane	ND	
1,1-Dichloroethene	ND	
1,2,4-Trimethylbenzene	0.511	J
1,3,5-Trimethylbenzene	ND	
2,2,4-Trimethylpentane	0.677	J
Benzene	0.872	
Carbon tetrachloride	0.428	
cis-1,2-Dichloroethene	ND	
Cyclohexane	0.286	J
Ethylbenzene	0.334	J
Heptane	0.57	J
Methylene chloride	0.691	J
Naphthalene	ND	
n-Hexane	1.44	
o-Xylene	6.34	
p/m-Xylene	1.28	J
Tetrachloroethene	0.461	
Toluene	1.47	
Trichloroethene	ND	
Vinyl chloride	ND	

LOCATION	NYSDOH AGVs	SC-IAQ04	SC-SSV04	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	ND	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	ND	ND	No further action
Carbon tetrachloride	~	0.434	ND	No further action
cis-1,2-Dichloroethene	~	0.297	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	0.93	16.7	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	2.03	39.8	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	ND	ND	No further action
p/m-Xylene	~	ND	ND	No further action
Tetrachloroethene	30	0.332	1640	Mitigate
Toluene	~	0.991	ND	No further action
Trichloroethene	2	ND	74.7	Mitigate
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ03	SC-SSV03	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	ND	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	ND	ND	No further action
Carbon tetrachloride	~	0.415	ND	No further action
cis-1,2-Dichloroethene	~	ND	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	ND	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	1.71	ND	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	1.26	ND	No further action
p/m-Xylene	~	ND	ND	No further action
Tetrachloroethene	30	0.359	1630	Mitigate
Toluene	~	1.64	ND	No further action
Trichloroethene	2	ND	10	No further action
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ01	SC-SSV01	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
1,2,4-Trimethylbenzene	~	1.35	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	0.7	ND	No further action
Carbon tetrachloride	~	0.478	ND	No further action
cis-1,2-Dichloroethene	~	0.091	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	1.97	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	2.27	ND	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	0.912	ND	No further action
p/m-Xylene	~	2.29	ND	No further action
Tetrachloroethene	30	1.1	1160	Mitigate
Toluene	~	7.99	ND	No further action
Trichloroethene	2	ND	11.5	No further action
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ02	SC-SSV02	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	1.29	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	0.645	ND	No further action
Carbon tetrachloride	~	0.459	ND	No further action
cis-1,2-Dichloroethene	~	0.099	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	1.84	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	0.765	6.94	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	0.895	ND	No further action
p/m-Xylene	~	2.27	ND	No further action
Tetrachloroethene	30	1.27	895	No further action
Toluene	~	10.6	3.39	No further action
Trichloroethene	2	ND	83.8	Mitigate
Vinyl chloride	~	ND	ND	No further action

LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

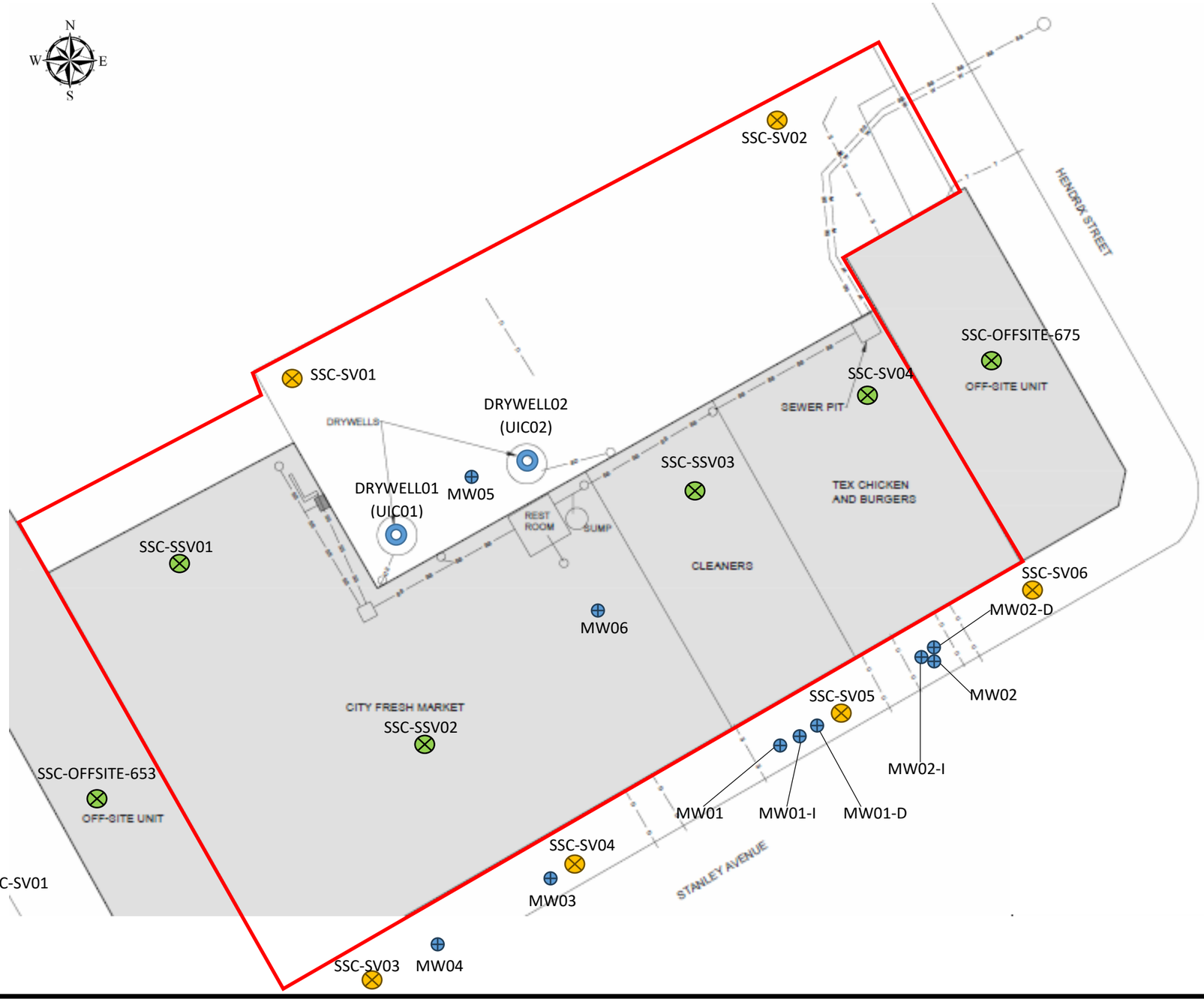
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

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Figure 13
SOIL VAPOR INTRUSION ANALYTICAL COMPARISON

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Proposed Permanent Soil Vapor Sample Locations
- Proposed Sub-Slab Vapor Sample Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

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Figure 14
PROPOSED SAMPLE LOCATIONS

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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TABLES

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TABLE 1
PROJECT PERSONNEL
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE#224415

Role	Name	Phone Numbers	Email
Project Manager	Jessica Ferngren, PG	Office - 631-482-1818 Cell- 631-416-2660	jessicaf@castletonenv.com
QA/QC Officer	Frank P. Castellano, PG	Office - 631-482-1818 Cell- 631-416-1222	frankc@castletonenv.com
Field Services Manager	John Zator	Office - 631-482-1818 Cell- 631-572-0991	jzator@castletonenv.com
Owner Contact	Barry Cohen, Esq. (counsel for property owner)	Office -516-296-7044	bcohen@certilmanbalin.com
Third Party Data Validator	FPM Group- Stephanie Davis	Office-(631) 737-6200 ext. 528	s.davis@fpm-group.com

TABLE 2
SUPPLEMENTAL SITE CHARACTERIZATION SAMPLING MATRIX
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

Matrix	Number of Sample Locations	Proposed Sample Locations	Number of Samples to be Collected/Analyzed	Field and Trip Blanks	Analyses	Minimum Reporting Requirements	Matrix Spike/Matrix Spike Duplicates	Duplicates	Sample Preservation	Sample Container Volume/Type	Sample Hold Time
Groundwater	4	Monitoring wells MW03, and MW05 DRYWELL01 and DRYWELL02	4-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	by USEPA Methods 6010 and 7470/7471 (total)	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	HNO3, pH<2, 0-6°C	Plastic (1) 500 ml	28 days
Groundwater	4	Monitoring wells MW03, and MW05 DRYWELL01 and DRYWELL02	4-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Target Analyte List (TAL) Metals by USEPA Methods 6010 and 7470/7471 (dissolved);	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	Plastic (1) 500 ml	28 days
Vapor	9	Soil Vapor Investigation including sub-slab soil vapor samples (SC-SSV01 through SC-SSV04), 4 basement indoor air samples (SC-IAQ01 through SC-IAQ04); 1 outdoor air sample (SC-OAQ01)	12-SAMPLES	NOT APPLICABLE	VOCs (Method TO-15/TO-15 SIM)	In accordance with the NYSDOH Soil Vapor Intrusion Guidance and Updates (last updated February 2024)	NOT APPLICABLE	1-Duplicate per 20 samples	NOT APPLICABLE	6 liter SUMMA * with 2 hour regulators	7 Days

APPENDIX A
SITE CHARACTERIZATION REPORT – MAY 2025 (REVISED SEPTEMBER 2025)

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Site Characterization Report

655-671 Stanley Avenue, Brooklyn, New York
NYSDEC Site #224415

MAY 2025
(REVISION 1 – SEPTEMBER 2025)

Prepared for:
Unidos ZR LLC

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street
Long Island City, NY 11101

Prepared by:
Castleton Environmental Geologic Services DPC
70 West Main Street
Babylon, New York 11702

Project Number:
ZDEZ2403

SITE CHARACTERIZATION REPORT
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
MAY 2025 (REVISION 1 – SEPTEMBER 2025)
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2403

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Table 3 – Analytical Results – Groundwater
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Appendix B – Geophysical Survey Report
Appendix C – Community Air Monitoring Data
Appendix D – Monitoring Well Logs
Appendix E – Field Sampling Forms
Appendix F – Monitoring Well Survey
Appendix G –Drum Disposal Facility Approval/Drum Disposal Manifest
Appendix H – Laboratory Reports
Appendix I – Data Usability Summary Reports
Appendix J – Surrounding Properties Environmental Reports
Appendix K – Sensitive Receptor Mapping Information

SITE CHARACTERIZATION REPORT
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
MAY 2025 (REVISION 1 – SEPTEMBER 2025)
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2403

I, Jessica Ferngren, PG, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Site Characterization Report was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and DER Green Remediation (DER-31).

Jessica Ferngren

Name



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1.0 INTRODUCTION

On behalf of Unidos ZR LLC, Castleton Environmental Geologic Services DPC (Castleton) has prepared the following Site Characterization (SC) Report for the property located at 655-671 Stanley Avenue, Brooklyn, New York (the site). This report was completed in response to the assignment of NYSDEC Site No. 224415 to the site and the subsequent Order on Consent executed December 12, 2024. This SC report was completed in accordance with the SC Work Plan approved by NYSDEC approved on March 4, 2025. This SC report includes the site history, summary of previous investigations, and the SC approach and field activities conducted to determine environmental site status.

2.0 SITE BACKGROUND

2.1 Site Description

The site is located at 655-671 Stanley Avenue, Brooklyn, New York (Figure 1). The site consists of one (1) irregular-shaped parcel with an estimated area of 0.34 acres in size. The site is improved with one-story (1) commercial building with a full basement, and asphalt-paved parking lots in the front and rear of the building which is at basement grade. The building has an estimated gross floor area of 11,330 square feet and contains a total of three (3) commercial units ((City Fresh Market, one (1) vacant unit (former Lily's Dry Cleaner), and Tex's Chicken & Burgers)). A review of the New York City Building Department property profile overview indicated that the existing building was constructed in 1950. The building occupies most of the parcel and is bordered by landscaped areas, municipal walkways, and right-of-ways.

The site is bound to the south by Stanley Avenue, to the north by commercial and residential properties, to the east by a commercial property and Hendrix Street, and to the west by commercial properties with Van Siclen Avenue beyond.

A land use and sensitive receptor map is included as Figure 2. The site plan is included as Figure 3.

2.2 Site Environmental Setting

The surface topography of the Site and surrounding vicinity was obtained from the USGS (https://apps.nationalmap.gov/downloader/#/). The topographic elevation of the Site is approximately 10-15 feet above mean sea level (MSL) at sidewalk grade.

Soil observed during the previous investigation events consisted primarily of fine sand and silt. Groundwater was observed at approximately 1 to 2 feet below basement grade and between 10 and 10.5 feet below sidewalk grade to the south of the building along Stanley Avenue.

The site is located within the Atlantic Coastal Plain physiographic province of New York. This province is characterized by an eastward thickening wedge of sediment deeply underlain by a metamorphic bedrock. Although this area is part of the Coastal Plain, the regional geology is

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characterized by depositional landforms of continental glaciers created through the retreat of the Wisconsin ice sheet in the Late Cretaceous and Pleistocene. Locally the unconsolidated sands and gravels associated with the outwash plains predominate at depth. Shallower surface soils in the vicinity of the Site are characterized as urban fill materials. Regionally, groundwater flow is southerly toward Jamaica Bay.

2.3 Site History

Currently, the building contains a total of three (3) commercial units (City Fresh Market, former Lily's Dry Cleaner, and Tex's Chicken & Burgers).

A review of the New York City Building Department property profile overview indicated that the existing building was constructed in 1950.

Previous tenants of the site include:

- Supermarkets from 1960 through present
- A dry cleaner on the 663 Stanley Avenue portion of the site on the 1965 through 2007
- Several retail stores including bakeries, laundry, pharmacy, clothing and fabric stores, and other miscellaneous retail sales.

2.4 Previous Investigations

Previous investigations conducted for due diligence purposes in 2023, prior to the current owner purchasing the property, identified chlorinated volatile organic compounds (VOCs) including tetrachloroethene (PCE) in groundwater, indoor air, and subsurface vapor. At the time of the previous investigations, an active dry cleaner was on-site. The dry cleaner ceased operations and vacated the site in May 2023 when the current owner took possession of the property.

Phase II Environmental Site Assessment (ESA) – February 2023

Castleton completed a Phase II ESA in February 2023. The objective of this investigation was to assess on-site subsurface quality in relation to on-site dry cleaning operations. This objective was met by the performance of a geophysical survey and the collection and laboratory analysis of soil, groundwater, ambient air, and vapor samples.

During the geophysical survey, accessible areas of the dry cleaner tenant space basement were inspected and scanned. No evidence of floor drains was observed. The municipal sewer connection was found to extend under the adjacent tenant spaces.

Three soil borings were advanced, and three soil samples and three groundwater samples collected for laboratory analysis. Soil analytical results reported concentrations of volatile organic compounds (VOCs) below Unrestricted Use soil cleanup objectives (SCOs) or as non-detect. Tetrachloroethene (PCE), a common dry cleaning chemical, was detected in one of the three soil samples below Unrestricted Use SCOs. Groundwater analytical results reported concentrations of one VOC, PCE slightly above Ambient Water Quality Standards (AWQS) in one of the three

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groundwater samples analyzed at 5.9 ug/l with the standard at 5 ug/l. PCE was detected below applicable standards in the two other groundwater samples. All other VOCs were reported as non-detect.

Four indoor air samples and one sub-slab vapor sample were collected, and laboratory analyzed for VOCs. Indoor air sample results reported concentrations of PCE above Air Guideline Values (AGVs) in the four air samples analyzed ranging from 902 ug/m^3 within the grocery space to 1,970 ug/m^3 within the vacant space prior to Tex's Chicken and Burgers taking occupancy. The reported concentrations in sub-slab vapor (3.97 ug/m^3) and the highest indoor air analytical concentrations were entered into the applicable NYSDOH matrices. The NYSDOH recommended action for PCE is to "Identify Sources and Resample or Mitigate".

Since the highest indoor air concentrations were reported in the adjacent vacant space, Castleton recommended additional investigation to determine if dry cleaning contaminants have migrated beneath this tenant space.

Analytical summary maps are included as Figures 4, 5, and 6.

Supplemental Phase II ESA – March 2023

Castleton completed a Supplemental Phase II ESA in March 2023. The objective of this investigation was to further assess on-site subsurface quality in relation to the on-site dry cleaning operations. This objective was met by the performance of a geophysical survey and the collection and laboratory analysis of sediment, groundwater, and vapor samples.

During the geophysical survey, accessible areas grocery store tenant space basement were inspected and scanned. Sumps and floor drains were observed connected to municipal sewer. Additionally, dry cleaning machine support posts were observed adjacent to the main sump pit. Two direct discharge drywells were observed in the rear parking lot area.

Two sediment samples were collected from the drywells. Sediment analytical results reported concentrations of toluene above Unrestricted Use and Restricted Residential Use SCOs at 130,000 ug/kg in UIC02. Acetone was reported above Unrestricted Use SCOS, but below Restricted Residential Use SCOs in both DRYWELL01 (UIC01) and DYRWELL02 (UIC02) at 180 ug/kg and 1,100 ug/kg, respectively. Methyl ethyl ketone was reported above Unrestricted Use SCOS, but below Restricted Residential Use SCOs in UIC02 at 1,900 ug/kg.

Two soil borings were advanced, and two groundwater samples collected for laboratory analysis. Groundwater analytical results reported concentrations of one VOC, PCE slightly above AWQS in both groundwater samples analyzed at 9.9 ug/l in GW01 and 6.8 ug/l in GW02.

Four sub-slab vapor samples were collected, and laboratory analyzed for VOCs. Indoor air sample results from the previous investigation were compared with these sub-slab vapor results.

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According to the NYSDOH soil vapor intrusion decision matrices, the recommended action for cis-1,2-dichloroethene, PCE, and TCE is to "Mitigate".

Analytical summary maps are included as Figures 4, 5, and 6.

Remedial Investigation – February 2024

In February 2024, Castleton completed a Remedial Investigation. The objective of this investigation was to further assess on-site subsurface quality in relation to former on-site dry cleaning operations. This objective was met by the performance of a geophysical survey, monitoring well installation and survey, and the collection and laboratory analysis of sediment, groundwater, air and vapor samples.

During the geophysical survey, accessible areas of the basement beneath the grocery store and former dry cleaning tenant space were inspected and scanned. Sumps and floor drains were observed connected to municipal sewer. Additionally, dry cleaning machine support posts were observed adjacent to the main sump pit. Two direct discharge stormwater drywells were observed in the rear parking lot area.

Six monitoring wells were installed, developed, and surveyed. Two groundwater gauging and sampling events occurred in January and February 2024. Groundwater flows towards the southeast. PCE concentrations were observed in groundwater with the highest concentration at 9.4 ug/l in monitoring well MW01 located downgradient of the former dry cleaner. Elevated concentrations of chloromethane were observed during the second sampling event.

Sediment analytical results reported concentrations of VOCs, semi-volatile organic compounds (SVOCs), and metals in the two drywells sampled.

Two sub-slab vapor and five indoor air samples were collected and analyzed for VOCs. The concentration of PCE detected in one of the sub-slab samples (SSV02 at 1,380 ug/m^3) triggers the "mitigate" recommendation and one of the sub-slab concentrations (SSV01 at 594 ug/m^3) triggers the "monitor" recommendation in Matrix B of the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006).* However, the concentrations of PCE, as well as trichloroethene (TCE), and methylene chloride, that were collected from all five indoor air samples were reported below the NYSDOH Air Guidelines Values.

On February 26, 2024, NYSDEC was notified of the Remedial Investigation findings, and Spill # 2309256 was assigned. The DEC Spill project manager passed the file to the Division of Environmental Remediation due to the concentrations of chlorinated VOCs reported on site.

Analytical summary maps are included as Figures 7 and 8.

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Chemical Removal Summary Letter – July 20, 2024

As per the Chemical Removal Summary Letter, dated July 30, 2024, the equipment, chemicals, and clothing were removed from the former dry cleaner tenant space in May 2024 to prepare the tenant space to be rented.

Drywell Remediation Summary Report – July 2024

Castleton completed the Drywell Remedial Summary report in July 2024. The scope of work to remediate the impacted structures consisted of removing liquid and soil from two (2) drywells DRYWELL01 (UIC01) and DRYWELL02 (UIC02). Remedial activities were performed by PAL Environmental Services Inc. of Long Island City, New York, with direction and oversight provided by Castleton. Remedial efforts were conducted on June 11, 2024. 688 gallons of liquid were removed and properly disposed of at Clean Waters of New York of Staten Island, New York. Approximately 1.91 tons of sediment were removed from the stormwater drywells and disposed of as non-hazardous waste at Dale Transfer Corporation of West Babylon, New York.

Soil and groundwater endpoint samples were collected from each structure to assess the effectiveness of the remedial effort.

Soil endpoint sample results reported concentrations of VOCs and SVOCs as non-detect or below applicable criteria. Soil analytical results reported concentration of one metal, chromium, above Unrestricted Use and Protection of Groundwater SCOs in DRYWELL01 (UIC01). All other metals were reported as non-detect or below Unrestricted Use and Protection of Groundwater SCOs.

Groundwater analytical results reported concentration of VOCs, SVOCs, and metals above applicable criteria.

Castleton concluded that soil remediation within the drywells has been completed to the extent possible. Castleton recommended that groundwater remedial actions be addressed under a separate cover.

An analytical summary map is included as Figure 9.

2.5 Areas of Concern

Areas of concern were developed to describe the existing site information, contaminants of potential concern, and potentially affected media (soil, groundwater, soil vapor). Figures 4 through 9 shows sample location from previous investigations and remedial activities and the analytical results exceeding applicable regulatory criteria.

Soil

Drywell remediation soil endpoint samples reported concentrations of chromium in one drywell, DRYWELL01 (UIC01), above Unrestricted Use and Protection of groundwater SCOs. All remaining

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VOCs, SVOCs, and metals were reported as non-detect or below applicable criteria. The soil endpoints following the remediation were collected approximately 3 feet below the water table.

Drywell remediation groundwater endpoint samples reported concentrations of VOCs including PCE at 11 ug/l in drywell DRYWELL01 (UIC01), above the standard of 5 ug/l and methyl ethyl ketone at 82 ug/l in drywell UIC02, above the standard of 50 ug/l.

Several SVOCS were reported slightly above guidance values in the drywell groundwater endpoint samples.

Total metals including aluminum, cadmium, chromium, iron, and sodium were reported above standards in DRYWELL01 (UIC01) and aluminum and iron were reported above standards in DRYWELL02 (UIC02). This may be attributed to elevated turbidity in the groundwater samples.

Dissolved metals including sodium was reported above standards in drywell UIC01 and iron was reported above standards in DRYWELL02 (UIC02). The remaining dissolved metals were reported below applicable standards.

Groundwater

For purposes of this SC, groundwater is considered an Area of Concern. Groundwater analytical results in the monitoring wells reported concentrations of PCE in all monitoring wells ranging from 2.2 ug/l to 9.4 ug/l. However, PCE only slightly exceeded the applicable AWGS of 5 ug/l in one location, MW01, at 9.4 ug/l.

Potential Soil Vapor Intrusion

Two sub-slab soil vapor samples were collected and analyzed. Soil vapor analytical results reported PCE in one vapor sample, SSV02, at 1,380 ug/m^3, above the vapor response threshold of 1,000 ug/m^3. This sample was located below the former dry cleaner unit.

Based on the data collected, the drywells may have contained the source of the PCE observed.

3.0 SITE CHARACTERIZATION

The scope of work for the site characterization (SC) included:

- A geophysical survey to determine sewer and drainage pathways and to clear locations of underground obstructions prior to intrusive activities commencing;
- Installation of additional groundwater monitoring wells to assess vertical groundwater quality;
- Groundwater sampling to assess post remedial effects on groundwater quality;
- A soil vapor intrusion (SVI) investigation to assess appropriate vapor mitigation measures.

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Castleton conducted the SC on behalf of the site owner Unidos ZR LLC. All SC work was overseen by a Qualified Environmental Professional (QEP) and/or a NYS Professional Geologist (PG). The Quality Assurance Project Plan (QAPP) is included in Appendix A.

3.1 Geophysical Survey

A geophysical survey was performed to identify subsurface anomalies indicative of direct drainage structures, buried utilities, etc. to clear locations prior to intrusive activities commencing. The survey consisted of the use of several remote sensing techniques including a magnetometer survey to detect ferrous objects, ground penetrating radar survey (GPR) to detect changes in soil density, and a utility locating device to trace identified piping.

The geophysical survey was conducted on March 25 and 26, 2025 by East Coast Geophysics, Inc. of Bensalem, PA.

The findings of the geophysical survey are as follows:

1. Metallic Anomalies / underground storage tanks (USTs) – No metallic anomalies consistent with USTs were detected within close proximity to the client proposed sample locations.
2. Roof Drains – The roof drains located along the north side of the building discharge into the two drywells located in the asphalt lot.
3. Sanitary Sewer – The sanitary sewer traverses throughout the floor of the basement from west to east to a sewer pit located in the Tex Chicken and Burgers unit. The sewer then traverses north and east and discharges to the sewer manhole located in Hendrix Street.

The geophysical survey report and map are included in Appendix B.

3.2 Groundwater Monitoring Well Installation

Groundwater monitoring well installation was completed to vertically delineate impacts previously seen downgradient of the former dry cleaner unit. The monitoring wells were installed on March 31 and April 1, 2025, by PAL Environmental Safety Corp. (PAL) of Long Island City, New York

Prior to intrusive activities commencing, the drilling contractor notified NYS Code Rule 753/Dig Safe System for mark outs and NYCDOT sidewalk permits were obtained. Community air monitoring program (CAMP) activities were conducted during intrusive activities. The CAMP data is included in Appendix C.

Two monitoring well clusters were installed as shown on Figure 10. Monitoring wells MW01-I and MW01-D were installed adjacent to MW01. Monitoring wells MW02-I and MW02-D were installed adjacent to MW02.

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Each monitoring well cluster consists of one intermediately zoned well with a well screen spanning from 20 feet to 30 feet below sidewalk grade (MW01-I and MW02-I) and one deeply zoned well with a well screen spanning from 30 feet to 40 feet below sidewalk grade (MW01-D and MW02-D).

Monitoring wells were constructed of two-inch diameter 0.01-inch slotted PVC with 10 foot screens and applicable risers to grade. The annulus was backfilled with Morie #02 well gravel approximately two feet above the top of the screen and an overlying one to two foot bentonite seal, and the balance was backfilled with bentonite grout. The top of each well casing was capped with an expansion-fit locking well cap and a flush mount manhole cover set in concrete at the surface. Monitoring well construction logs are included in Appendix D.

Newly installed monitoring wells were properly developed by pumping and surge methods. Water quality parameters including pH, dissolved oxygen (DO), temperature, oxidation reduction potential (ORP), conductivity and turbidity were recorded. The well development logs are included in Appendix E. Well development water was containerized for proper offsite disposal.

3.3 Groundwater Monitoring Well Sampling

The newly installed monitoring wells were allowed to stabilize for one week prior to sampling. Monitoring wells MW01, MW02, MW03, MW04, MW05, and MW06 were gauged and sampled on April 7, 2025. Monitoring wells MW01-I, MW01-D, MW02-I, MW02-D were gauged and sampled on April87, 2025.

At each well, the depth to the static water level and depth of the well was measured with an interface probe to the nearest $1/100^{th}$ of a foot. Non-aqueous-phase liquid (NAPL) was not observed in any of the monitoring wells gauged.

Groundwater sampling was conducted using low-flow purging techniques as described in USEPA Low-Flow Minimal Groundwater Sampling Procedures dated April 1996 and Sampling, Analysis and Assessment of Per-And Polyfluoroalkyl Substances Under NYSDEC's Part 375 Remediation Programs dated April 2023.

A decontaminated low-flow pump equipped with dedicated HDPE tubing was used to purge the well until the turbidity of the produced water is less than 50 NTU. Field parameters including pH, turbidity, DO, specific conductivity, and temperature, were monitored and recorded. When all stability parameters vary by less than 10 percent between the removal of successive well volumes, the well was sampled. Well sampling forms documenting the well purging and sampling procedures and measurements are included in Appendix E. Well purging water was containerized for proper offsite disposal.

Samples for PFAS were obtained before any other sampling was performed. PFAS samples were obtained using only dedicated disposable HDPE tubing. The retrieved samples were placed into

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laboratory supplied sample containers. Following the completion of PFAS sampling, and after those samples have been properly secured, sampling for 1,4-dioxane occurred, followed by sampling for the other analyte groups.

Groundwater samples were submitted to Pace Analytical Services (Pace), a NYSDOH ELAP certified laboratory and analyzed for:

- Target Compound List (TCL) VOCs by USEPA Method 8260;
- TCL Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270;
- Target Analyte List (TAL) Metals by USEPA Methods 6010 and 7470/7471 (total and dissolved);
- Polychlorinated Biphenyls by USEPA Method 8082;
- Pesticides by USEPA Method 8081;
- NYSDEC target analyte list PFAS (April 2023) by USEPA Method 1633; and
- 1,4-Dioxane by USEPA Method 8270 in selective ion monitoring (SIM) mode.

The analytical methods used for testing were as per NYS Analytical Services Protocol (ASP) with Category B deliverables. A sample summary is included in Table 1.

Quality Assurance/Quality Control (QA/QC) samples, including blind duplicates and matrix spike (MS)/MS duplicates (MSD) were collected at a rate of 1 per 20. Laboratory-provided trip blanks were included in sample coolers containing VOC samples and analyzed for VOCs only. Disposable sampling equipment was used to purge groundwater and collect representative samples from each well. The Quality Assurance Project Plan (QAPP) is included as Appendix A.

On April 8, 2025, an elevation survey was conducted for all monitoring wells by Perfect Point Land Surveying of Brooklyn, NY. The well elevation survey is included in Appendix F.

3.4 Soil Vapor Intrusion Investigation

A soil vapor intrusion investigation was conducted within the three tenant spaces in the locations shown on Figure 10. Sampling locations were installed, and subsequent sampling was performed in accordance with the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)* and subsequent updates.

A building inspection and chemical inventory of products present within the building was documented to determine if chemicals presently used at the site may influence the indoor air results. The inventory is included in Appendix E.

Four temporary sub-slab vapor points were installed by PAL on March 25, 2025. Two vapor points, SC-SSV01 and SC-SSV02, were installed within the supermarket basement. One vapor point, SC-SSV03, was installed within the former dry cleaner basement. One vapor point, SC-SSV04, was installed within the restaurant basement. Each vapor point was set within two inches

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of the base of the building slab and set with a stainless steel screen and dedicated tubing. The vapor point was sealed with bentonite at the surface.

On March 26, 2025, each vapor sample point was purged, screened with a photoionization detector (PID) for the presence of VOCs, and the integrity of the seal checked using a tracer gas (helium) measured in the field to ensure the seal was tight.

The sub-slab vapor samples were set up at each location with a co-located indoor air sample (SC-IAQ01 through SC-IAQ04). Indoor air sample intakes were set three to five feet above the basement floor to assess breathing zone conditions. The indoor air samples were collected concurrently with the sub-slab vapor samples.

One outdoor air sample (SC-OAQ01) was collected concurrently to assess background conditions.

Four indoor air, four sub-slab vapor, and one outdoor ambient air samples were collected for laboratory analysis in laboratory certified 6-liter Summa canisters fitted with eight (8) hour regulators to limit air flow to less than 0.2 liters/minute.

Air/vapor samples were submitted to Pace, a NYSDOH ELAP certified laboratory, and analyzed for VOCs by USEPA Methods TO-15/TO-15 SIM.

The analytical methods used for testing were as per NYS Analytical Services Protocol (ASP) with Category B deliverables.

Quality Assurance/Quality Control (QA/QC) samples including blind duplicates were collected at a rate of 1 per 20. The Quality Assurance Project Plan (QAPP) is included as Appendix A. A sample summary is included in Table 1.

Notification of Test Results letters were sent to City Fresh Market located at 655 Stanley Avenue and Tex's Chicken and Burgers located at 667 Stanley Avenue on May 12, 2025. These letters detailed the findings of the soil vapor intrusion investigation results.

3.5 Management of Investigation-Derived Waste

All groundwater that was generated during the SC was containerized for offsite disposal, transported by a licensed waste transporter and properly disposed offsite at permitted waste disposal facility. Waste transport and disposal manifests are included in Appendix G.

3.6 Health and Safety Plan

All SC activities were conducted in accordance with the health and safety planning requirements as outlined in the Health and Safety Plan (HASP) provided with the SC Work Plan.

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3.8 Green and Sustainable Remediation

Actions to complete the site investigation were done to comply with NYSDEC DER-31 Green Remediation dated January 20, 2011.

Applicable actions which complied with DER-31 for this investigation include:

- Low Flow Groundwater Sampling to reduce the volume of purged groundwater to be disposed.
- Use of electric drilling equipment to install soil vapor sampling points
- Minimize drilling equipment idling
- Use of direct push technology for well installation to limit soil investigative derived waste.

4.0 GROUNDWATER ELEVATION AND FLOW

Groundwater elevations were determined from well elevation data and well gauging activities conducted on April 7 and 8, 2025. Groundwater elevation and gauging data is included in Table 2. A groundwater contour map showing flow direction for the April gauging event is included as Figure 11. Groundwater flows towards the southeast which is consistent with previous findings.

5.0 ANALYTICAL RESULTS

5.1 Groundwater Analytical Results

Groundwater analytical results compared to NYSDEC TOGS 1.1.1 AWQS and Guidance Values (GVs.)

Volatile Organic Compounds (VOCs)

PCE concentrations reported in MW01 and MW02 slightly exceeded the AWQS of 5 ug/l at 9.2 ug/l and 5.4 ug/l, respectively. PCE concentrations in shallow monitoring wells ranged from 0.82 ug/l in MW05 located in the northern parking lot adjacent to stormwater drywells to 9.2 ug/l in MW01, located directly downgradient of the former dry cleaner. PCE was reported as non-detect in deep monitoring wells MW01-I, MW01D, and MW02-I, MW02-D.

Benzene was reported was reported at 1.7 ug/l in groundwater sample MW06, slightly above its AWQS of 1 ug/l. The remaining groundwater samples reported concentrations of benzene as non-detect.

Of note, trichloroethene TCE was reported at 0.69 ug/l in MW01, 0.19 J ug/l in MW02, 0.26 J ug/l in MW-03, non-detect in MW04, 0.22 J ug/l in MW05, and 0.5 ug/l in MW06, below its AWQS of 5 in all shallow groundwater samples analyzed. TCE was reported as non-detect in the deeper groundwater samples analyzed.

The remaining VOCs analyzed were reported as non-detect or below applicable criteria.

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Semi-Volatile Organic Compounds (SVOCs)
Benzo(a)anthracene was reported above GVs in groundwater samples MW01-D, MW02-I and MW03 at 0.04J ug/L, 0.03 J ug/L, and 0.03 J ug/L, respectively.

Hexachlorobenzene was reported above AWQS/GVs at 0.06 J ug/l in groundwater sample MW01-D.

The remaining SVOCs analyzed reported concentrations as non-detect or below applicable criteria.

It should be noted that several SVOCs' detection limits were reported above GVs however, this does not impact data quality.

1,4-Dioxane
1.,4-Dioxane was reported as non-detect or below applicable criteria in the ten groundwater samples analyzed.

PFAS
PFOAs were reported in all groundwater samples, including upgradient MW05, ranging from 0.0316 ug/l in MW03 to 0.0628 ug/l in MW06, above its AWQS of 0.0067 ug/l.

PFOSs were reported in all groundwater samples, including upgradient MW05, ranging from 0.019 ug/l in MW01-D to 0.0837 ug/l in MW05, above its AWQS of 0.0027 ug/l.

Pesticides
Dieldrin was reported in above AWQS at 0.011J ug/l in MW02-I and 0.006 J ug/l in MW02-D, above its AWQS of 0.004 ug/l. All other pesticides were reported as non-detect.

PCBs
PCBs were reported as non-detect in the ten groundwater samples analyzed.

Total Metals
Chromium was reported at 98.94 ug/l in MW03 above its AWQS of 50 ug/l. The remaining samples reported concentrations of chromium below applicable criteria.

Iron was reported in six of the ten groundwater samples exceeding AWQS with a maximum concentration of 3,840 ug/l in MW05.

Manganese was reported in seven of the ten groundwater samples exceeding AWQS with a maximum concentration of 1,768 ug/l in MW05.

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Sodium was reported in all ten groundwater samples exceeding its AWQS with a maximum concentration of 143,000 ug/l in MW02-D.

Dissolved Metals

Dissolved chromium was reported in one of the ten groundwater samples exceeding AWQS at 104.4 ug/l in MW03.

Dissolved iron was reported in one of the ten groundwater samples exceeding AWQS at 1.140 ug/l in MW05.

Dissolved manganese was reported in six of the ten groundwater samples exceeding AWQS with a maximum concentration of 1,581 ug/l in MW05.

Dissolved sodium was reported nine of the ten groundwater samples above its AWQ with a maximum concentration of 143,000 ug/l in MW02-D.

Groundwater analytical summary tables are provided in Table 3. The groundwater exceedances are shown on Figure 12.

5.2 Soil Vapor Intrusion Analytical Results

5.2.1 Ambient Air Analytical Results

Indoor air quality analytical results were compared to NYSDOH AGVs. AGVs are applicable to a limited list of compounds including methylene chloride (60 micrograms per cubic meter (ug/m3), PCE (30 ug/m3) and TCE (2 ug/m3).

Indoor air sample results reported concentrations of VOCs of concern below their applicable AGVs in the samples analyzed.

The ambient air analytical summary tables are provided in Table 4.

5.2.2 NYSDOH Soil Vapor Intrusion Analytical Comparison

The reported concentrations in the indoor air and sub-slab vapor analytical concentrations from this sampling event were entered into the applicable NYSDOH decision matrices. The tables compare the results of the sub-slab vapor samples to that of the indoor air samples. The results of this comparison yield the NYSDOH's recommended action.

Mitigation is the recommended action for PCE in three of the four SVI data sets with a maximum sub-slab vapor concentration of 1,640 ug/m3 in SC-SSV04.

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Mitigation is the recommended action for TCE in two of the four SVI data sets with a maximum sub-slab vapor concentration of 83.8 ug/m3 in SC-SSV02. TCE was reported as non-detect in all indoor air samples.

The vapor analytical summary is included in Table 5. The SVI comparison map is included as Figure 13.

5.3 Data Usability

5.3.1 Groundwater Data

According to the Data Usability Summary Reports (DUSRs) prepared by FPM, the groundwater samples were reported to have been collected in accordance with the NYSDEC approved QAPP for this project. No field or laboratory conditions occurred that would result in non-valid analytical data other than as noted above. The data appear to be adequate for their intended purpose.

The laboratory data report is included in Appendix H. The DUSRs are included in Appendix I.

5.3.2 Soil Vapor Intrusion Data

According to the DUSR prepared by FPM, the soil vapor, indoor air, and ambient air samples were reported to have been collected in accordance with the NYSDEC-approved QAPP for this project. Two non-detect concentrations for acetone were flagged by the validator with J values to estimate those concentrations. Acetone was not detected or a concern for this project. The validator concluded that the data appear to be adequate for its intended purpose.

Laboratory reports are included in Appendix H. The DUSRs are included in Appendix I.

6.0 AREAS OF CONCERN

Areas of concern evaluated during this SC include:

1. VOCs concentrations within shallow groundwater downgradient of the former dry cleaner that slightly exceeded the applicable AWQS. Potential sources of chemicals have been removed from the property and are not currently being used. Groundwater is not utilized in the area of Brooklyn for potable purposes. Therefore, residual impacts to groundwater from PCE are present, but do not constitute a significant threat to human health and the environment.
2. Groundwater PFAS impacts were observed in each groundwater sample. . The reported concentrations were ubiquitous across the site. Additionally, according to surrounding data from upgradient site 673 Livonia Avenue, Brooklyn, NY (site 224352), upgradient site Sutter Crossing (C224331) cross-gradient 749 Van Sinderen Avenue, Brooklyn, NY (site C224405), PFAS have been reported in groundwater at similar concentrations. This suggests that PFAS present can be attributed to overall groundwater quality in the region of Brooklyn and the PFAS detected at the site does not pose a significant threat to human

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health and the environment. Reports for the surrounding properties can be found in Appendix J.

3. Concentrations of chromium in groundwater were limited to total and dissolved concentrations in one sample of the ten samples analyzed.
4. Metals concentrations of manganese, iron, and sodium in groundwater can be attributed to overall groundwater quality in this region of Brooklyn and these results do not constitute a significant threat to human health and the environment.
5. Dieldrin was reported above applicable criteria in two deep groundwater samples. This suggests that its presence is not from on site sources. Additionally, since groundwater is not used for drinking, these results do not constitute a significant threat to human health and the environment.
6. A potential soil vapor intrusion concern is present for PCE and TCE. TCE was reported as non-detect in indoor air. PCE was reported well below AGVs in indoor air. This suggests that the vapor intrusion pathway for PCE and TCE is not complete Since this property is not used for residential, the likelihood of exposures that would significantly impact human health are low.

7.0 HUMAN HEALTH EXPOSURE ASSESSMENT

The site is currently used as a commercial building. The site is fully paved within minimal topsoil exposure north of the rear parking lot. There are no plans to redevelop this property to a more sensitive use.

Environmental Media & Exposure Route	Human Exposure Assessment
Direct contact with subsurface soils (and incidental ingestions)	People can come into contact with subsurface soil during intrusive work in the area of concern. Currently, the site is capped with asphalt/concrete slab in the areas of concern and there is no human contact at the property to subsurface soil. Redevelopment or ground-intrusive work are not planned on-site.
Direct contact with groundwater	People can only come into contact with groundwater during intrusive work in the area of concern. Currently, the site is capped with asphalt in areas of concern and there is no human contact at the property to groundwater.

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	Redevelopment or ground-intrusive work are not planned on-site.
Ingestion of groundwater	There is no groundwater accessible for consumption at the site or surrounding area. No drinking water wells were identified within 0.5 miles of the site.
Subsurface Vapor/Soil Vapor Intrusion	Indoor air concentrations are below NYSDOH AGVs and OSHA Permissible Exposure Limits.

Several sensitive receptor populations within the immediate area of the site including, but not limited to:

- G Gershwin Junior High School, 800 Van Siclen Ave located across VanSiclen Avenue <0.1 miles from site to the west, up- and cross-gradient of the site.
- Good Shepherd Services Prince Joshua Community Center, 876 Schenck Ave 0.11 miles from site)

Sensitive receptor information from various accessible maps are included in Appendix K.

8.0 RECOMMENDATIONS

Based on the overall groundwater data set, residual chlorinated VOC impacts are present from former dry cleaning operations and one sample with a chromium exceedance. The highest concentrations of chlorinated VOCs are 9.2 ug/l above the AWQS of 5 ug/l. Additional monitoring is warranted to assess groundwater conditions.

As per NYSDOH Guidance, mitigation of vapors is warranted. The type of mitigation to be utilized will be assessed under a separate cover.

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FIGURES

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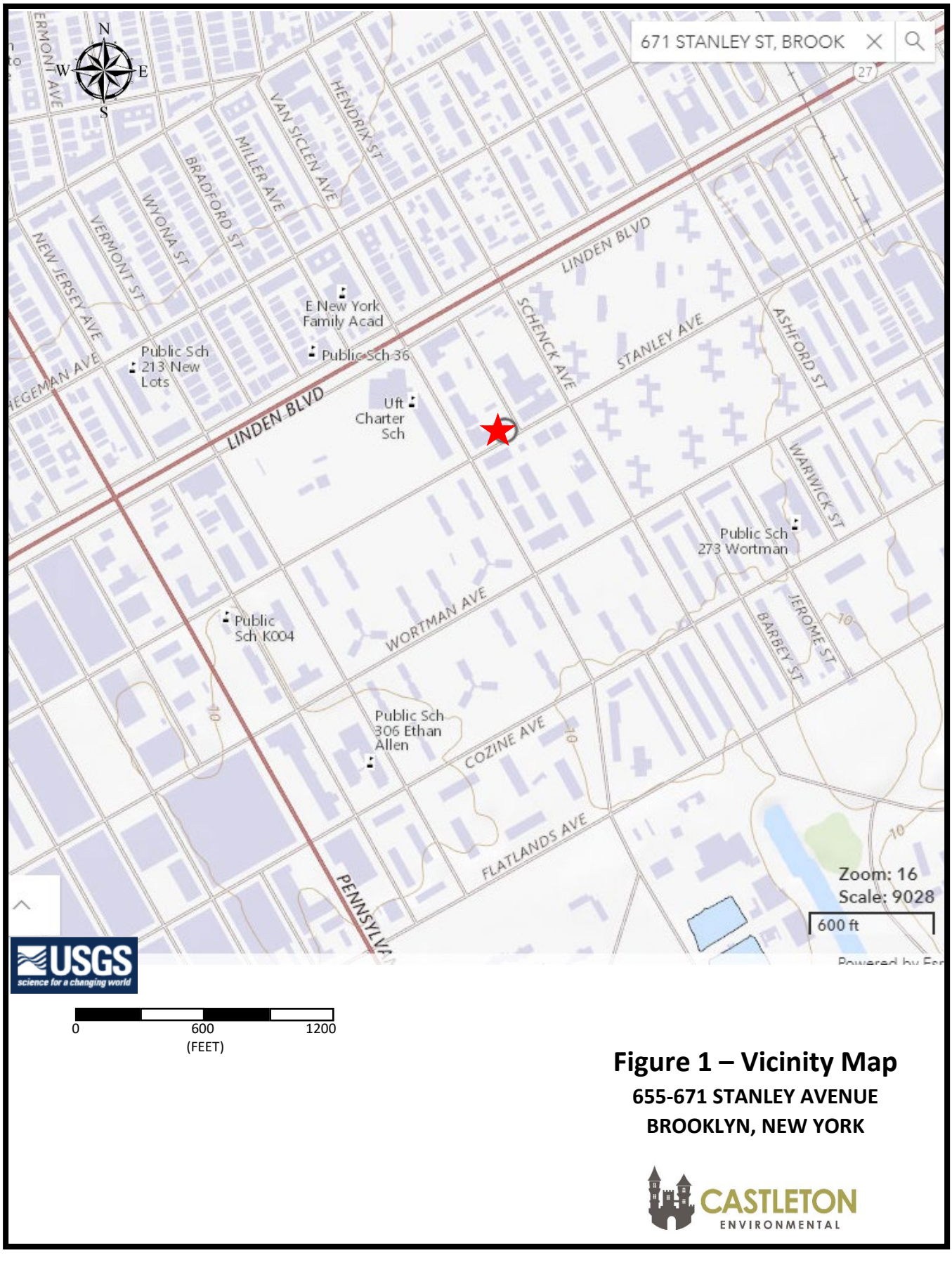
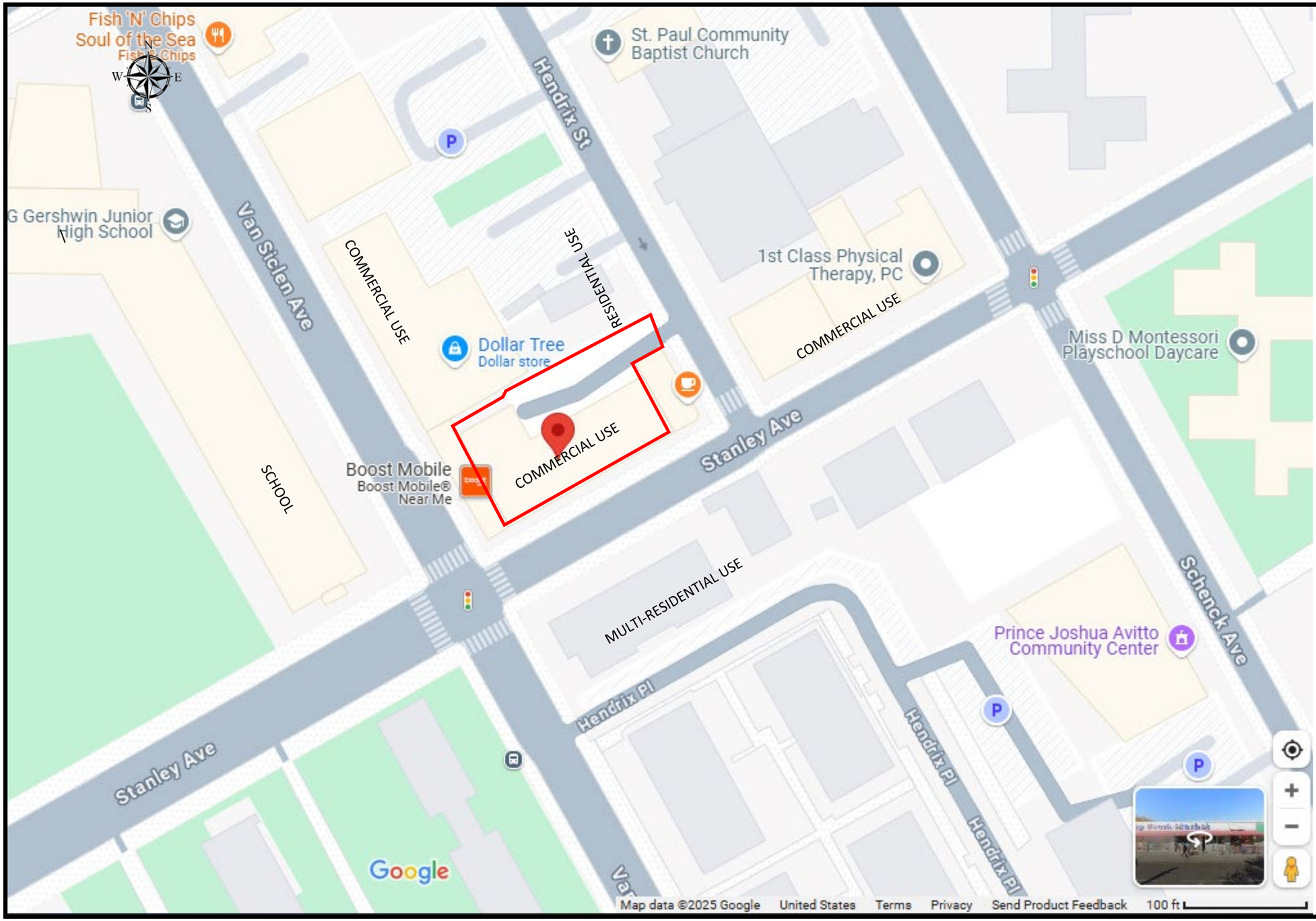


Figure 1 – Vicinity Map

655-671 STANLEY AVENUE

BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

SITE BOUNDARY

Figure 2
LAND USED AND SENSITIVE RECEPTOR MAP

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

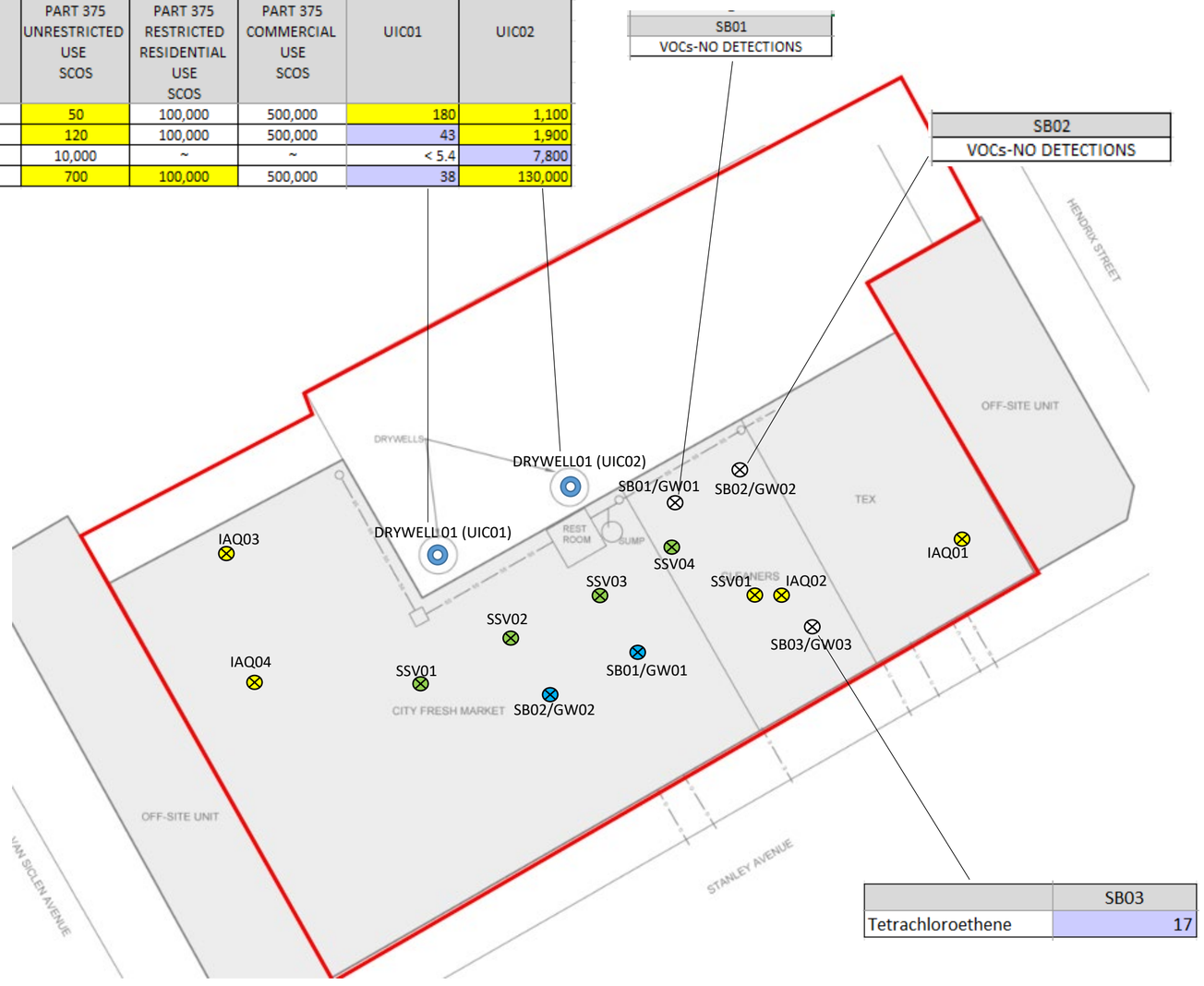
0 15 30
(FEET)

Figure 3
SITE PLAN

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL

	NYSDEC PART 375 UNRESTRICTED USE SCOS	NYSDEC PART 375 RESTRICTED RESIDENTIAL USE SCOS	NYSDEC PART 375 COMMERCIAL USE SCOS	UIC01	UIC02
Acetone	50	100,000	500,000	180	1,100
Methyl Ethyl Ketone	120	100,000	500,000	43	1,900
p-Isopropyltoluene	10,000	~	~	< 5.4	7,800
Toluene	700	100,000	500,000	38	130,000



	SB03
Tetrachloroethene	17

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

All results reported in ug/kg.

Yellow highlight shows exceedance of applicable criteria.

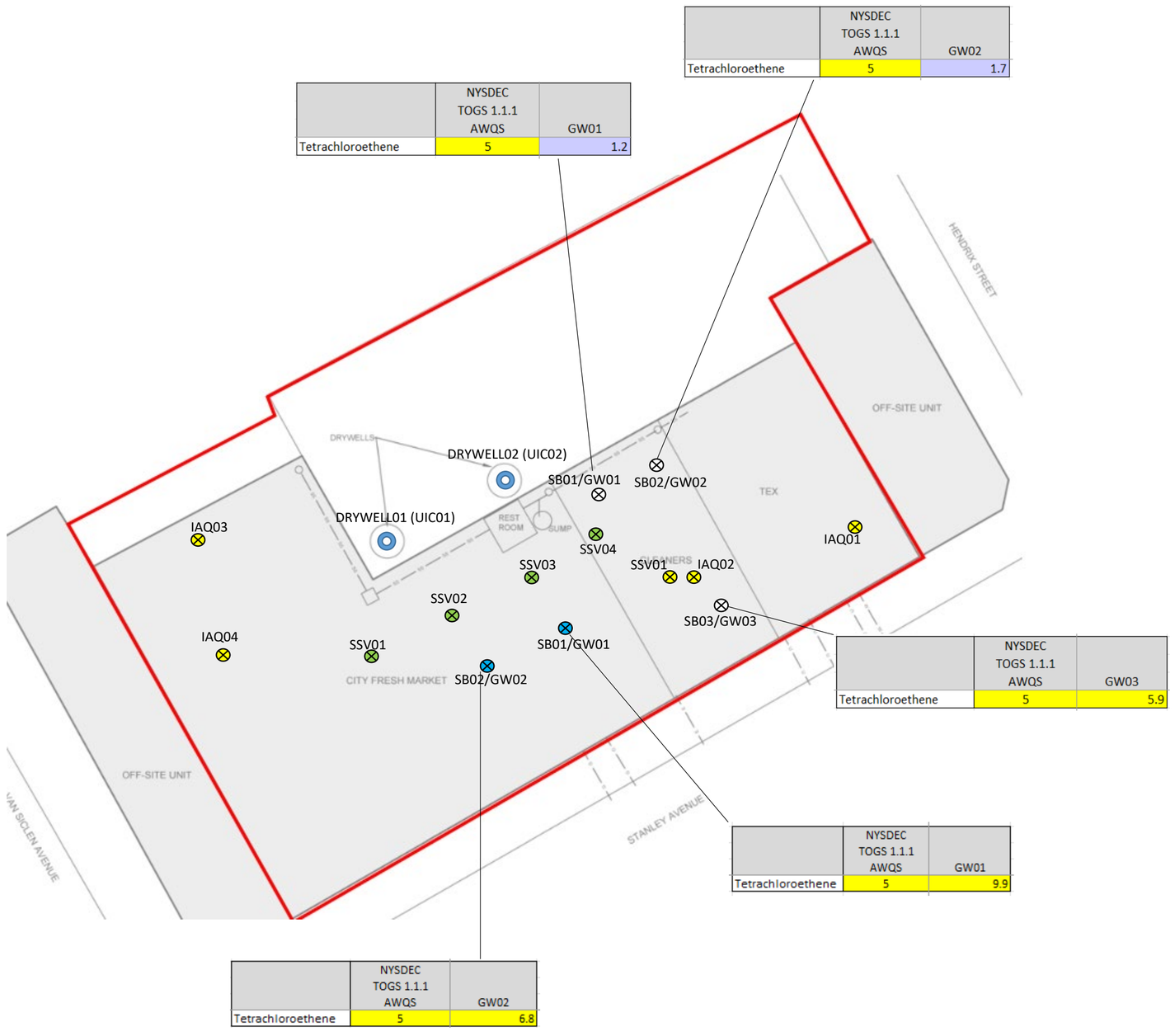
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 4
SOIL ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	NYSDEC TOGS 1.1.1 AWQS	GW01
Tetrachloroethene	5	1.2

	NYSDEC TOGS 1.1.1 AWQS	GW02
Tetrachloroethene	5	1.7

	NYSDEC TOGS 1.1.1 AWQS	GW03
Tetrachloroethene	5	5.9

	NYSDEC TOGS 1.1.1 AWQS	GW01
Tetrachloroethene	5	9.9

	NYSDEC TOGS 1.1.1 AWQS	GW02
Tetrachloroethene	5	6.8

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

All results reported in ug/l.

Yellow highlight shows exceedance of applicable criteria.

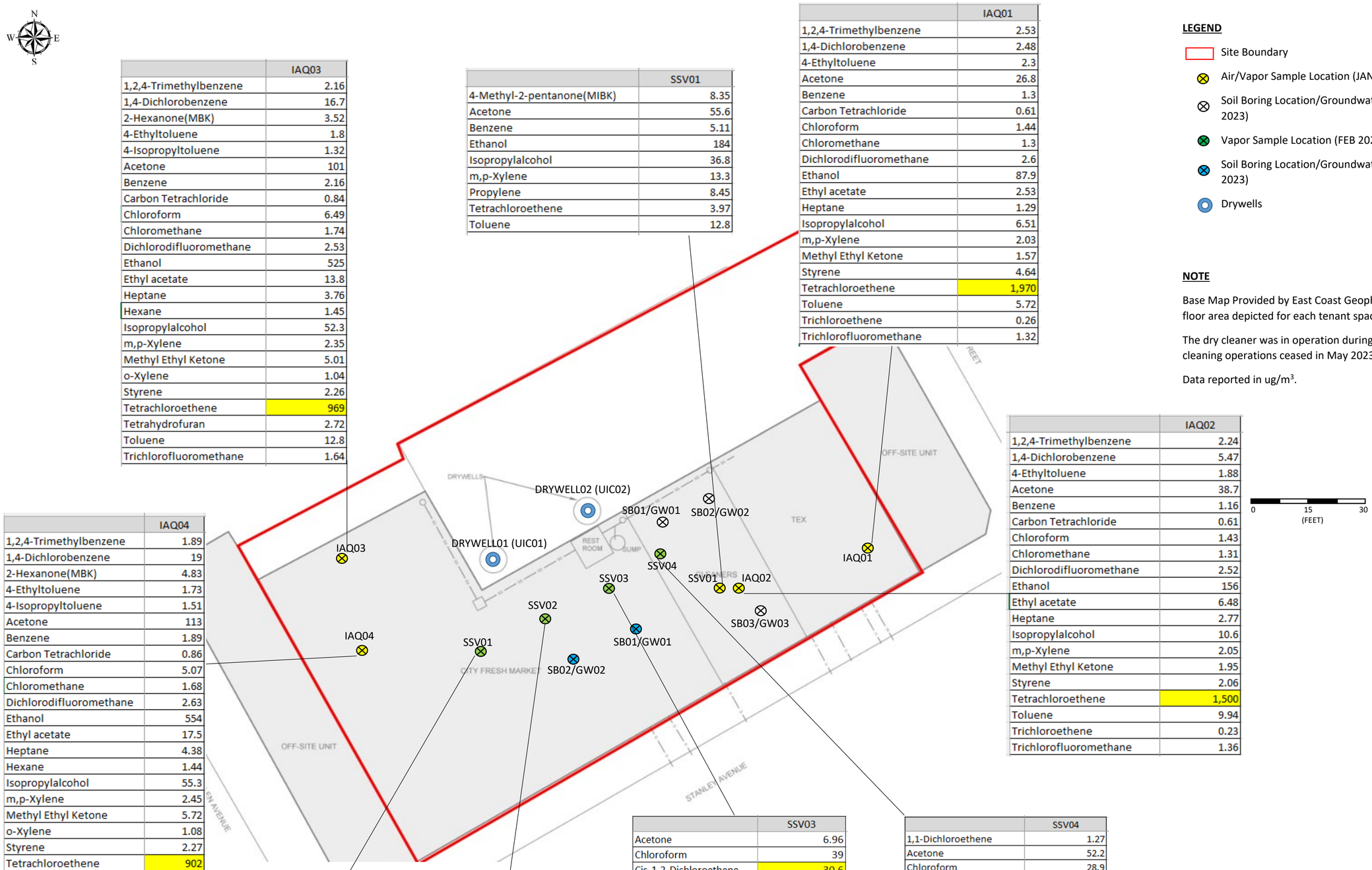
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 5
GROUNDWATER ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	IAQ03
1,2,4-Trimethylbenzene	2.16
1,4-Dichlorobenzene	16.7
2-Hexanone(MBK)	3.52
4-Ethyltoluene	1.8
4-Isopropyltoluene	1.32
Acetone	101
Benzene	2.16
Carbon Tetrachloride	0.84
Chloroform	6.49
Chloromethane	1.74
Dichlorodifluoromethane	2.53
Ethanol	525
Ethyl acetate	13.8
Heptane	3.76
Hexane	1.45
Isopropylalcohol	52.3
m,p-Xylene	2.35
Methyl Ethyl Ketone	5.01
o-Xylene	1.04
Styrene	2.26
Tetrachloroethene	969
Tetrahydrofuran	2.72
Toluene	12.8
Trichlorofluoromethane	1.64

	SSV01
4-Methyl-2-pentanone(MIBK)	8.35
Acetone	55.6
Benzene	5.11
Ethanol	184
Isopropylalcohol	36.8
m,p-Xylene	13.3
Propylene	8.45
Tetrachloroethene	3.97
Toluene	12.8

	IAQ01
1,2,4-Trimethylbenzene	2.53
1,4-Dichlorobenzene	2.48
4-Ethyltoluene	2.3
Acetone	26.8
Benzene	1.3
Carbon Tetrachloride	0.61
Chloroform	1.44
Chloromethane	1.3
Dichlorodifluoromethane	2.6
Ethanol	87.9
Ethyl acetate	2.53
Heptane	1.29
Isopropylalcohol	6.51
m,p-Xylene	2.03
Methyl Ethyl Ketone	1.57
Styrene	4.64
Tetrachloroethene	1,970
Toluene	5.72
Trichloroethene	0.26
Trichlorofluoromethane	1.32

	IAQ04
1,2,4-Trimethylbenzene	1.89
1,4-Dichlorobenzene	19
2-Hexanone(MBK)	4.83
4-Ethyltoluene	1.73
4-Isopropyltoluene	1.51
Acetone	113
Benzene	1.89
Carbon Tetrachloride	0.86
Chloroform	5.07
Chloromethane	1.68
Dichlorodifluoromethane	2.63
Ethanol	554
Ethyl acetate	17.5
Heptane	4.38
Hexane	1.44
Isopropylalcohol	55.3
m,p-Xylene	2.45
Methyl Ethyl Ketone	5.72
o-Xylene	1.08
Styrene	2.27
Tetrachloroethene	902
Tetrahydrofuran	3.12
Toluene	14.6
Trichlorofluoromethane	1.61

	IAQ02
1,2,4-Trimethylbenzene	2.24
1,4-Dichlorobenzene	5.47
4-Ethyltoluene	1.88
Acetone	38.7
Benzene	1.16
Carbon Tetrachloride	0.61
Chloroform	1.43
Chloromethane	1.31
Dichlorodifluoromethane	2.52
Ethanol	156
Ethyl acetate	6.48
Heptane	2.77
Isopropylalcohol	10.6
m,p-Xylene	2.05
Methyl Ethyl Ketone	1.95
Styrene	2.06
Tetrachloroethene	1,500
Toluene	9.94
Trichloroethene	0.23
Trichlorofluoromethane	1.36

	SSV01
Acetone	52.7
Chloroform	43
Ethanol	6.03
Methyl Ethyl Ketone	13.9
Tetrachloroethene	718
Trichloroethene	13.2

	SSV02
Cis-1,2-Dichloroethene	1.03
Ethanol	7.4
Tetrachloroethene	1,340
Toluene	6.36
Trichloroethene	114

	SSV03
Acetone	6.96
Chloroform	39
Cis-1,2-Dichloroethene	30.6
Ethanol	28.4
Isopropylalcohol	5.13
Tetrachloroethene	3,240
Trichloroethene	305

	SSV04
1,1-Dichloroethene	1.27
Acetone	52.2
Chloroform	28.9
Cis-1,2-Dichloroethene	83.2
Ethanol	8
Methyl Ethyl Ketone	5.87
Tetrachloroethene	2,290
Toluene	5.12
Trichloroethene	168

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN/FEB 2023)
- Soil Boring Location/Groundwater Sample Location (JAN 2023)
- Vapor Sample Location (FEB 2023)
- Soil Boring Location/Groundwater Sample Location (FEB 2023)
- Drywells

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

The dry cleaner was in operation during this sampling event. Dry cleaning operations ceased in May 2023.

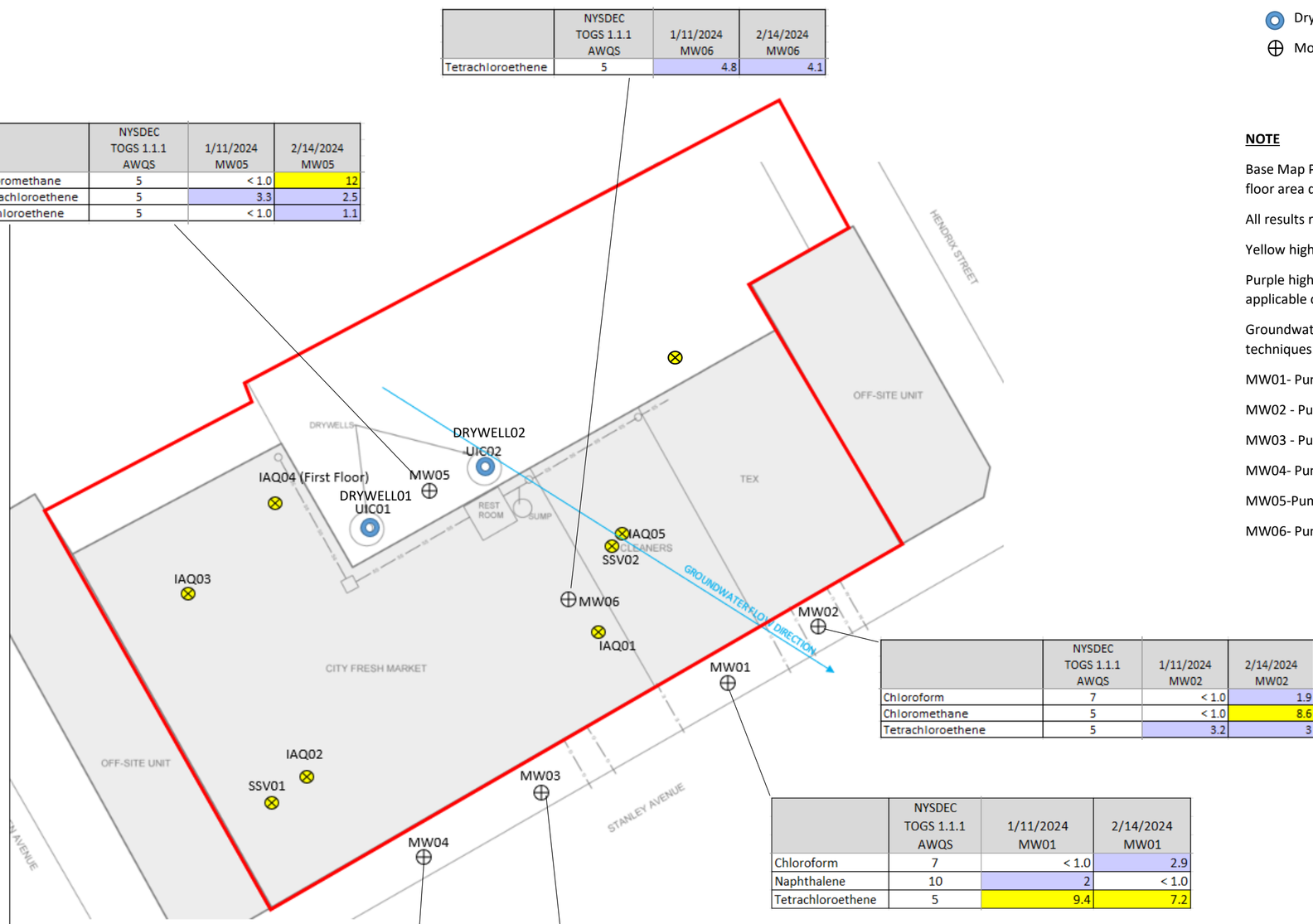
Data reported in ug/m^3.

0 15 30
(FEET)

Figure 6
AIR/VAPOR ANALYTICAL RESULTS
FEBRUARY/MARCH 2023

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW06	2/14/2024 MW06
Tetrachloroethene	5	4.8	4.1

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW05	2/14/2024 MW05
Chloromethane	5	< 1.0	12
Tetrachloroethene	5	3.3	2.5
Trichloroethene	5	< 1.0	1.1

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW02	2/14/2024 MW02
Chloroform	7	< 1.0	1.9
Chloromethane	5	< 1.0	8.6
Tetrachloroethene	5	3.2	3

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW01	2/14/2024 MW01
Chloroform	7	< 1.0	2.9
Naphthalene	10	2	< 1.0
Tetrachloroethene	5	9.4	7.2

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW04	2/14/2024 MW04
Chloroform	7	6.8	5.9
Chloromethane	5	< 1.0	26
Tetrachloroethene	5	3.5	5.7

	NYSDEC TOGS 1.1.1 AWQS	1/11/2024 MW03	2/14/2024 MW03
Chloroform	7	5.2	5
Tetrachloroethene	5	2.6	2.2

0 15 30
(FEET)

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

All results reported in ug/l.

Yellow highlight shows exceedance of applicable criteria.

Purple highlight shows detection of a compound below applicable criteria.

Groundwater sampling was conducted using low-flow purging techniques.

MW01- Pump intake set at 15 feet below grade.

MW02 - Pump intake set at 15.5 feet below grade.

MW03 - Pump intake set at 15.5 feet below grade.

MW04- Pump intake set at 16 feet below grade.

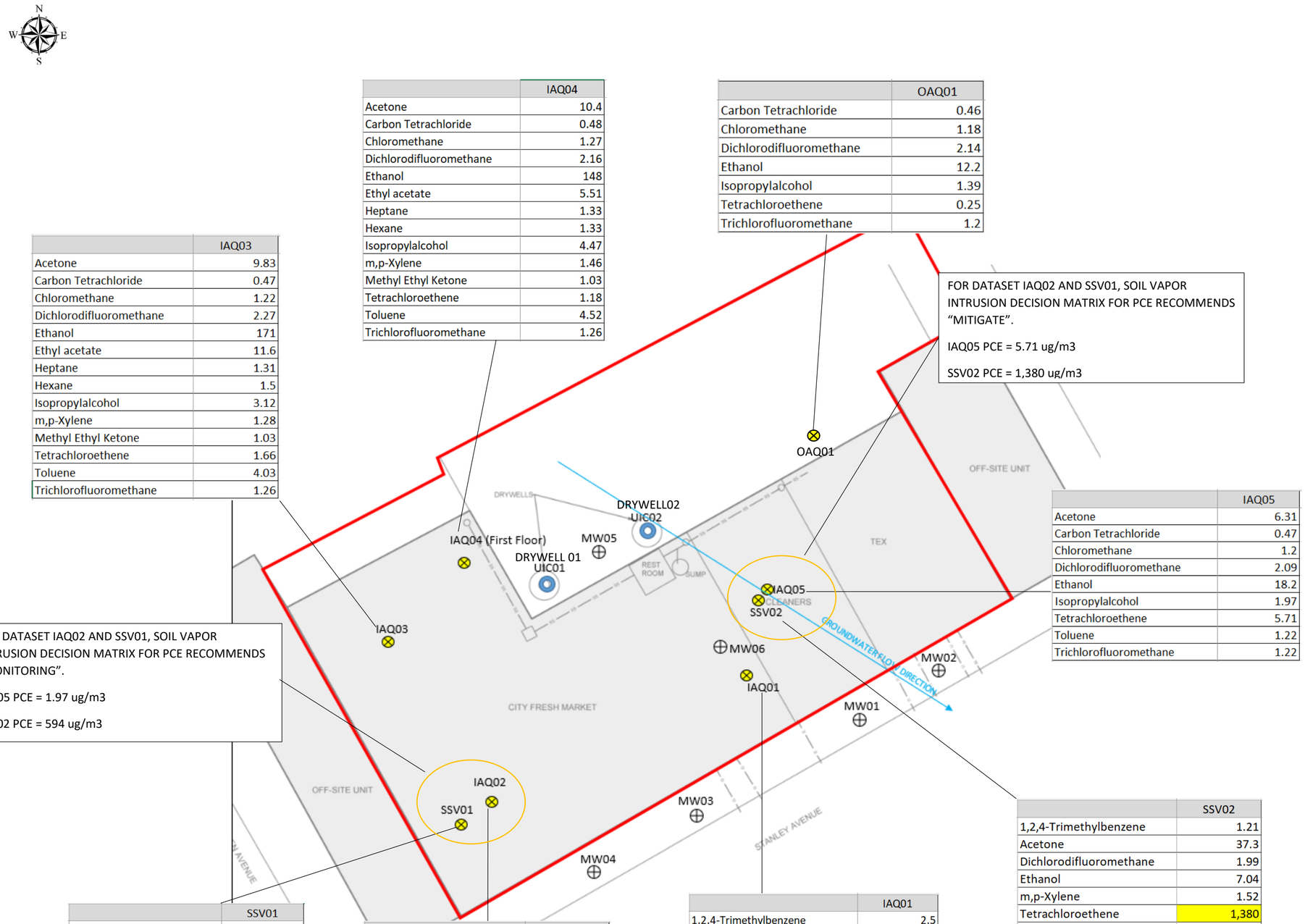
MW05-Pump intake set at 8 feet below grade.

MW06- Pump intake set at 2.5 feet below grade.

Figure 7
ANALYTICAL RESULTS-GROUNDWATER
JANUARY/FERBUARY 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



	IAQ04
Acetone	10.4
Carbon Tetrachloride	0.48
Chloromethane	1.27
Dichlorodifluoromethane	2.16
Ethanol	148
Ethyl acetate	5.51
Heptane	1.33
Hexane	1.33
Isopropylalcohol	4.47
m,p-Xylene	1.46
Methyl Ethyl Ketone	1.03
Tetrachloroethene	1.18
Toluene	4.52
Trichlorofluoromethane	1.26

	OAQ01
Carbon Tetrachloride	0.46
Chloromethane	1.18
Dichlorodifluoromethane	2.14
Ethanol	12.2
Isopropylalcohol	1.39
Tetrachloroethene	0.25
Trichlorofluoromethane	1.2

FOR DATASET IAQ02 AND SSV01, SOIL VAPOR INTRUSION DECISION MATRIX FOR PCE RECOMMENDS "MITIGATE".

IAQ05 PCE = 5.71 ug/m3

SSV02 PCE = 1,380 ug/m3

	IAQ03
Acetone	9.83
Carbon Tetrachloride	0.47
Chloromethane	1.22
Dichlorodifluoromethane	2.27
Ethanol	171
Ethyl acetate	11.6
Heptane	1.31
Hexane	1.5
Isopropylalcohol	3.12
m,p-Xylene	1.28
Methyl Ethyl Ketone	1.03
Tetrachloroethene	1.66
Toluene	4.03
Trichlorofluoromethane	1.26

	IAQ05
Acetone	6.31
Carbon Tetrachloride	0.47
Chloromethane	1.2
Dichlorodifluoromethane	2.09
Ethanol	18.2
Isopropylalcohol	1.97
Tetrachloroethene	5.71
Toluene	1.22
Trichlorofluoromethane	1.22

FOR DATASET IAQ02 AND SSV01, SOIL VAPOR INTRUSION DECISION MATRIX FOR PCE RECOMMENDS "MONITORING".

IAQ05 PCE = 1.97 ug/m3

SSV02 PCE = 594 ug/m3

	SSV02
1,2,4-Trimethylbenzene	1.21
Acetone	37.3
Dichlorodifluoromethane	1.99
Ethanol	7.04
m,p-Xylene	1.52
Tetrachloroethene	1,380
Toluene	1.7
Trichloroethene	7.84
Trichlorofluoromethane	1.33

	SSV01
1,1,1-Trichloroethane	2.85
1,2,4-Trimethylbenzene	1.66
Acetone	11.3
Chloroform	146
Chloromethane	2.97
Dichlorodifluoromethane	3.43
Ethanol	5.65
Heptane	2.67
Isopropylalcohol	78.1
m,p-Xylene	2.77
o-Xylene	1.56
Tetrachloroethene	594
Toluene	2.18
Trichloroethene	4.09
Trichlorofluoromethane	1.68

	IAQ02
1,2,4-Trimethylbenzene	1.23
Acetone	10.9
Carbon Tetrachloride	0.47
Chloromethane	1.26
Dichlorodifluoromethane	2.04
Ethanol	176
Ethyl acetate	5.65
Heptane	2.06
Hexane	1.36
Isopropylalcohol	3.76
m,p-Xylene	1.68
Methyl Ethyl Ketone	1.67
Tetrachloroethene	1.97
Toluene	7.01
Trichlorofluoromethane	1.26

	IAQ01
1,2,4-Trimethylbenzene	2.5
Acetone	12.3
Carbon Tetrachloride	0.48
Chloromethane	1.25
Dichlorodifluoromethane	2.2
Ethanol	205
Ethyl acetate	4.68
Heptane	3.58
Isopropylalcohol	4.72
m,p-Xylene	1.95
Methyl Ethyl Ketone	1.69
Tetrachloroethene	4.79
Tetrahydrofuran	1.54
Toluene	13.5
Trichlorofluoromethane	1.26

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

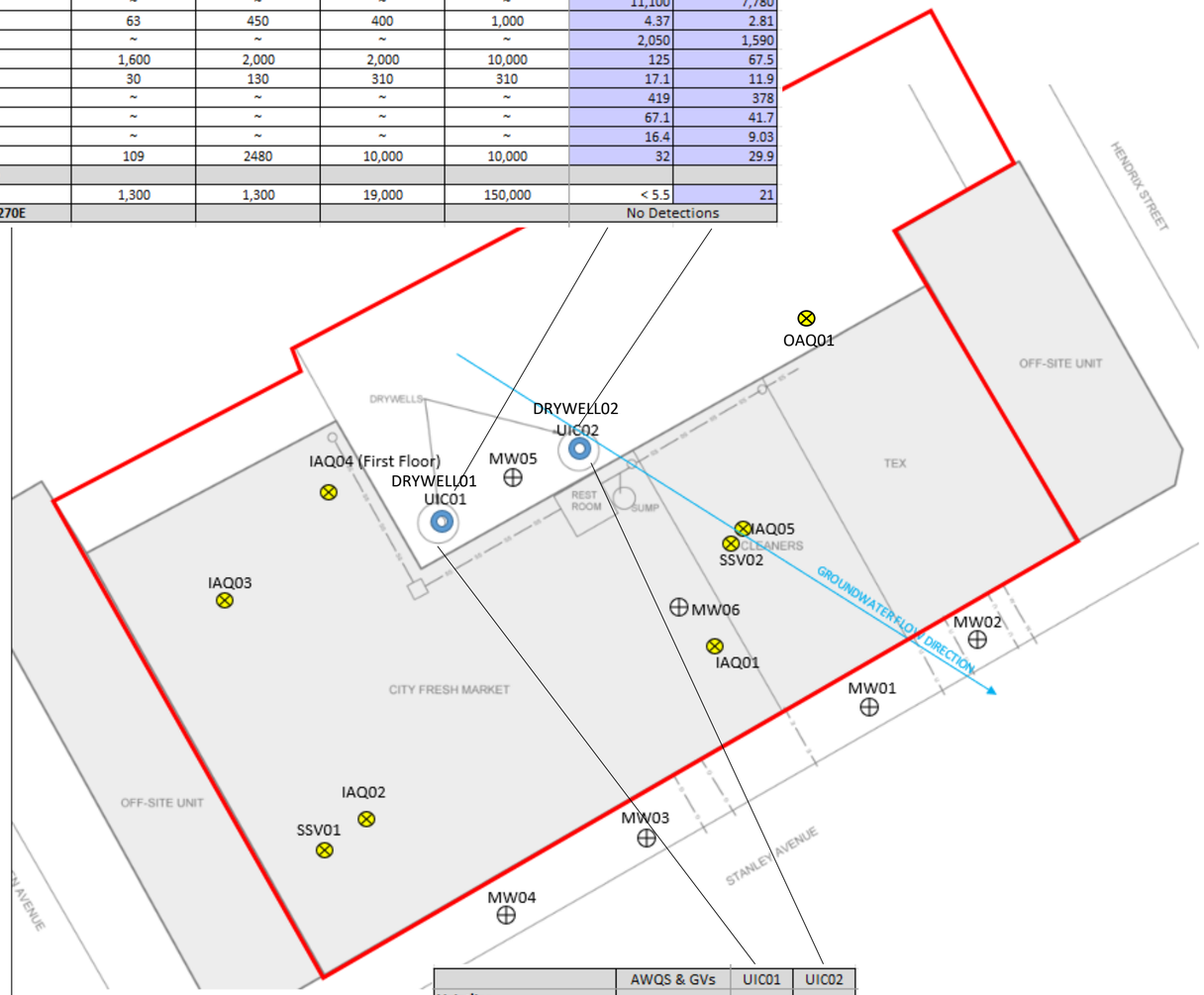
0 15 30
(FEET)

Figure 8
ANALYTICAL RESULTS-AIR AND VAPOR JANUARY 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL

Project Id : ZDEZ2402	NYSDEC PART 375 UNRESTRICTED USE SCOS	NYSDEC PART 375 PROTECTION OF GROUNDWATER SCOS	NYSDEC PART 375 RESTRICTED RESIDENTIAL USE SCOS	NYSDEC PART 375 COMMERCIAL USE SCOS	UIC01 Soil Result	UIC02 Soil Result
Metals						
Aluminum	~	~	~	~	3,690	3,100
Arsenic	13	16	16	16	2.3	< 0.93
Barium	350	820	400	400	10	10
Calcium	~	~	~	~	435	402
Chromium	1/30	19/NS	110/180	400/1500	40.8	14.5
Cobalt	~	~	~	~	3.77	3.46
Copper	50	1720	270	270	8.7	5.9
Iron	~	~	~	~	11,100	7,780
Lead	63	450	400	1,000	4.37	2.81
Magnesium	~	~	~	~	2,050	1,590
Manganese	1,600	2,000	2,000	10,000	125	67.5
Nickel	30	130	310	310	17.1	11.9
Potassium	~	~	~	~	419	378
Sodium	~	~	~	~	67.1	41.7
Vanadium	~	~	~	~	16.4	9.03
Zinc	109	2480	10,000	10,000	32	29.9
Volatiles By SW8260D						
Tetrachloroethene	1,300	1,300	19,000	150,000	< 5.5	21
Semivolatiles By SW8270E					No Detections	



	AWQS & GVs	UIC01	UIC02
Volatiles			
Methyl ethyl ketone	50	< 5.0	82
Tetrachloroethene	5	11	2.1
Semivolatiles			
Benz(a)anthracene	0.002	0.02	< 0.02
Benzo(a)pyrene	0.002	0.05	0.02
Benzo(b)fluoranthene	0.002	0.03	< 0.02
Benzo(k)fluoranthene	0.002	0.02	< 0.02
Indeno(1,2,3-cd)pyrene	0.002	0.04	0.02
Metals,			
Aluminum	0.1	3.83	0.753
Cadmium	0.005	0.011	0.001
Chromium	0.05	0.382	0.004
Iron	0.3	11.9	6.68
Sodium	20	35.3	12.9
Metals			
Iron (Dissolved)	0.3	0.013	2.64
Sodium (Dissolved)	20	32.1	11.4

LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

Groundwater results reported in ug/l.

Soil results reported in ug/kg.

Yellow highlight shows exceedance of applicable criteria.

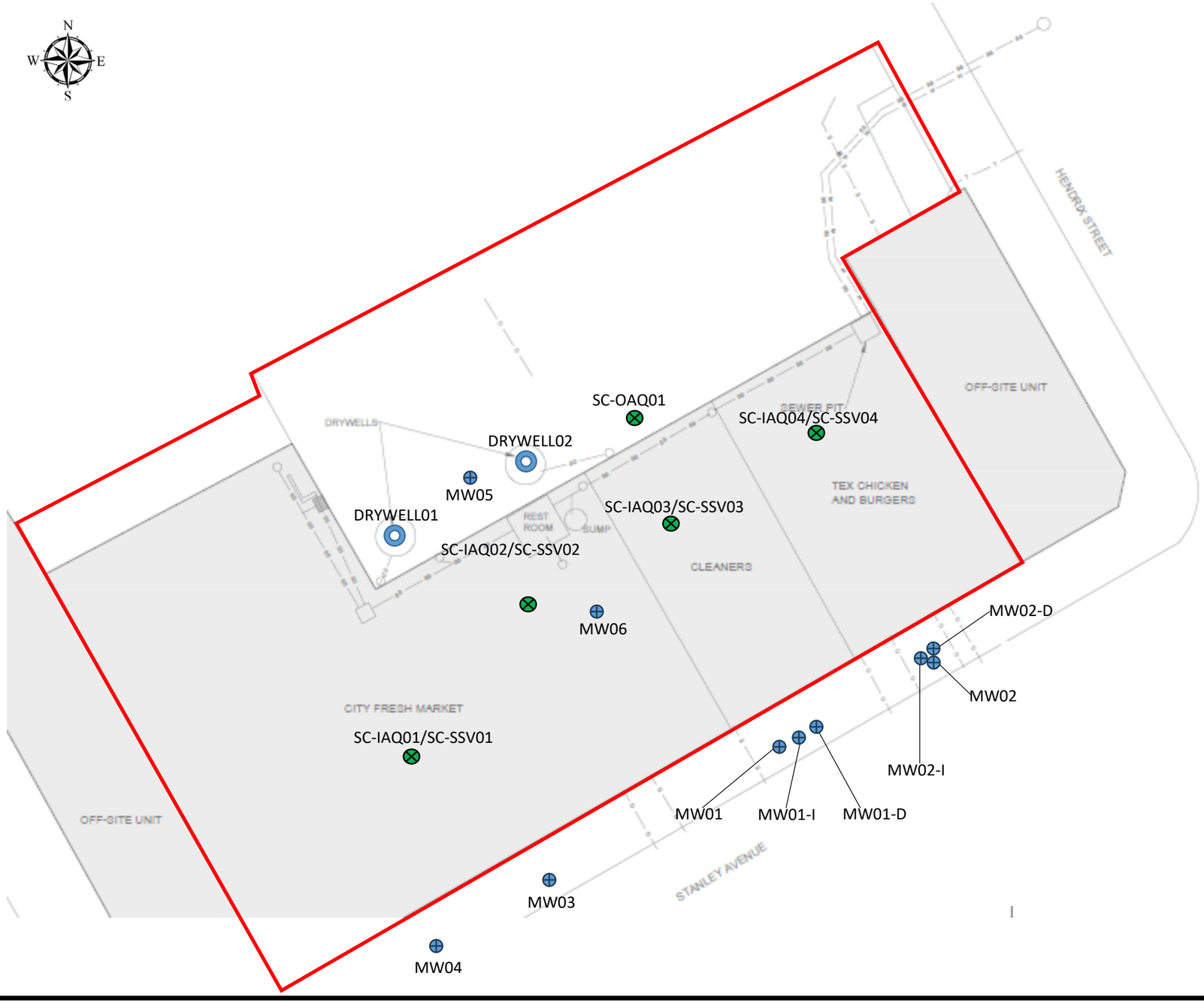
Purple highlight shows detection of a compound below applicable criteria.

0 15 30
(FEET)

Figure 9
ANALYTICAL RESULTS-DRYWELL ENDPOINTS
JUNE 2024

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

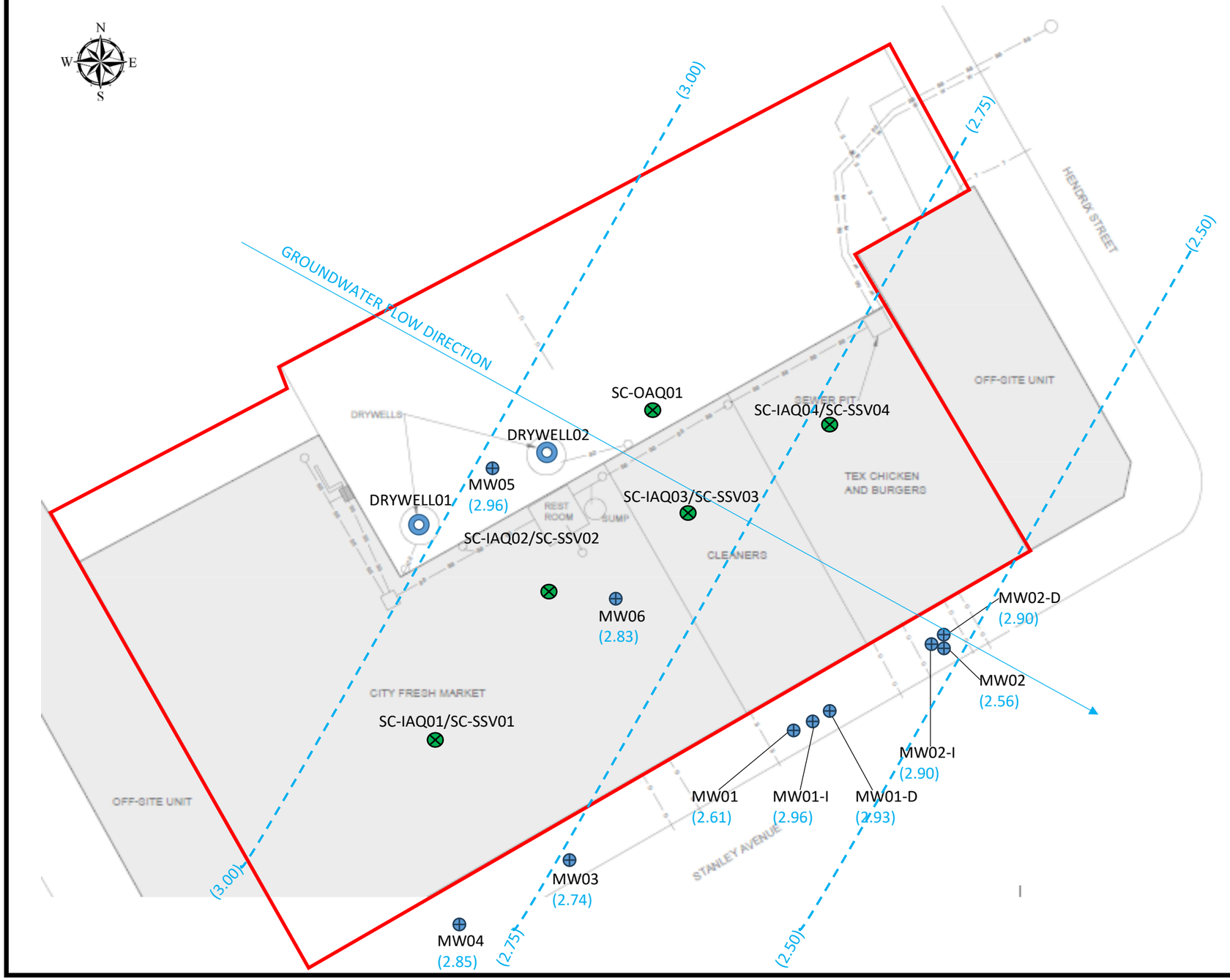
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 10
SAMPLE LOCATION MAP

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations
- (2.93) Groundwater Elevations- April 7 & 8, 2025

NOTE

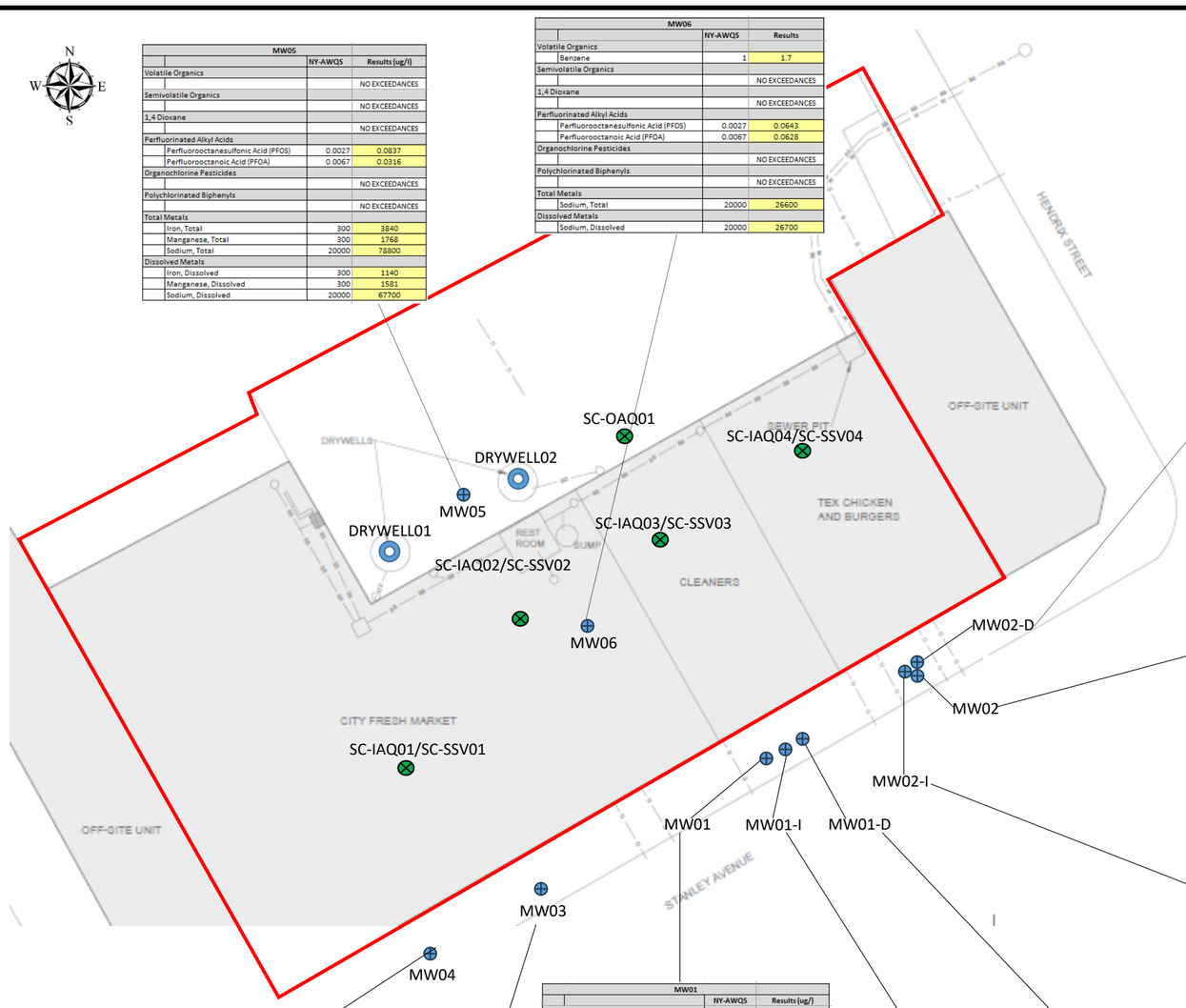
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 11
GROUNDWATER CONTOUR MAP SHALLOW - APRIL 2025

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



MW05		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0837
Perfluorooctanoic Acid (PFOA)	0.0067	0.0316
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	3840
Manganese, Total	300	1768
Sodium, Total	20000	78800
Dissolved Metals		
Iron, Dissolved	300	1140
Manganese, Dissolved	300	1581
Sodium, Dissolved	20000	67700

MW06		
	NY-AWQS	Results
Volatile Organics		
Benzene	1	1.7
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0643
Perfluorooctanoic Acid (PFOA)	0.0067	0.0628
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Sodium, Total	20000	26600
Dissolved Metals		
Sodium, Dissolved	20000	26700

MW02-D		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0242
Perfluorooctanoic Acid (PFOA)	0.0067	0.0578
Organochlorine Pesticides		
Dieldrin	0.004	0.006J
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	306
Manganese, Total	300	739.4
Sodium, Total	20000	143000
Dissolved Metals		
Manganese, Dissolved	300	792.8
Sodium, Dissolved	20000	143000

MW02		
	NY-AWQS	Results
Volatile Organics		
Tetrachloroethene	5	5.4
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0317
Perfluorooctanoic Acid (PFOA)	0.0067	0.0621
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Manganese, Total	300	812.9
Sodium, Total	20000	31100
Dissolved Metals		
Manganese, Dissolved	300	713.4
Sodium, Dissolved	20000	29400

MW02-I		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.03J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0206
Perfluorooctanoic Acid (PFOA)	0.0067	0.0526
Organochlorine Pesticides		
Dieldrin	0.004	0.011J
Polychlorinated Biphenyls by GC		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	433
Manganese, Total	300	316.8
Sodium, Total	20000	115000
Dissolved Metals		
Manganese, Dissolved	300	314.4
Sodium, Dissolved	20000	115000

MW01		
	NY-AWQS	Results (ug/)
Volatile Organics		
Tetrachloroethene	5	9.2
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0541
Perfluorooctanoic Acid (PFOA)	0.0067	0.054
Organochlorine Pesticides b		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Manganese, Total	300	909.3
Sodium, Total	20000	21100
Dissolved Metals		
Manganese, Dissolved	300	799.3

MW01-I		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.028
Perfluorooctanoic Acid (PFOA)	0.0067	0.0624
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	439
Manganese, Total	300	322.5
Sodium, Total	20000	91100
Dissolved Metals		
Sodium, Dissolved	20000	95500

MW01-D		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.04J
Hexachlorobenzene	0.04	0.06J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.019
Perfluorooctanoic Acid (PFOA)	0.0067	0.0571
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Iron, Total	300	539
Manganese, Total	300	610.7
Sodium, Total	20000	94100
Dissolved Metals		
Manganese, Dissolved	300	598.4
Sodium, Dissolved	20000	92000

MW04		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
		NO EXCEEDANCES
1,4 Dioxane		
		NO EXCEEDANCES
Organochlorine Pesticides		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0377
Perfluorooctanoic Acid (PFOA)	0.0067	0.0459
Polychlorinated Biphenyls by GC		
		NO EXCEEDANCES
Total Metals		
Sodium, Total	20000	71100
Dissolved Metals		
Sodium, Dissolved	20000	73400

MW03		
	NY-AWQS	Results (ug/l)
Volatile Organics		
		NO EXCEEDANCES
Semivolatile Organics		
Benzo(a)anthracene	0.002	0.03J
1,4 Dioxane		
		NO EXCEEDANCES
Perfluorinated Alkyl Acids		
Perfluorooctanesulfonic Acid (PFOS)	0.0027	0.0279
Perfluorooctanoic Acid (PFOA)	0.0067	0.0343
Organochlorine Pesticides		
		NO EXCEEDANCES
Polychlorinated Biphenyls		
		NO EXCEEDANCES
Total Metals		
Chromium, Total	50	98.94
Sodium, Total	20000	38700
Dissolved Metals		
Chromium, Dissolved	50	104.4
Sodium, Dissolved	20000	39100

LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

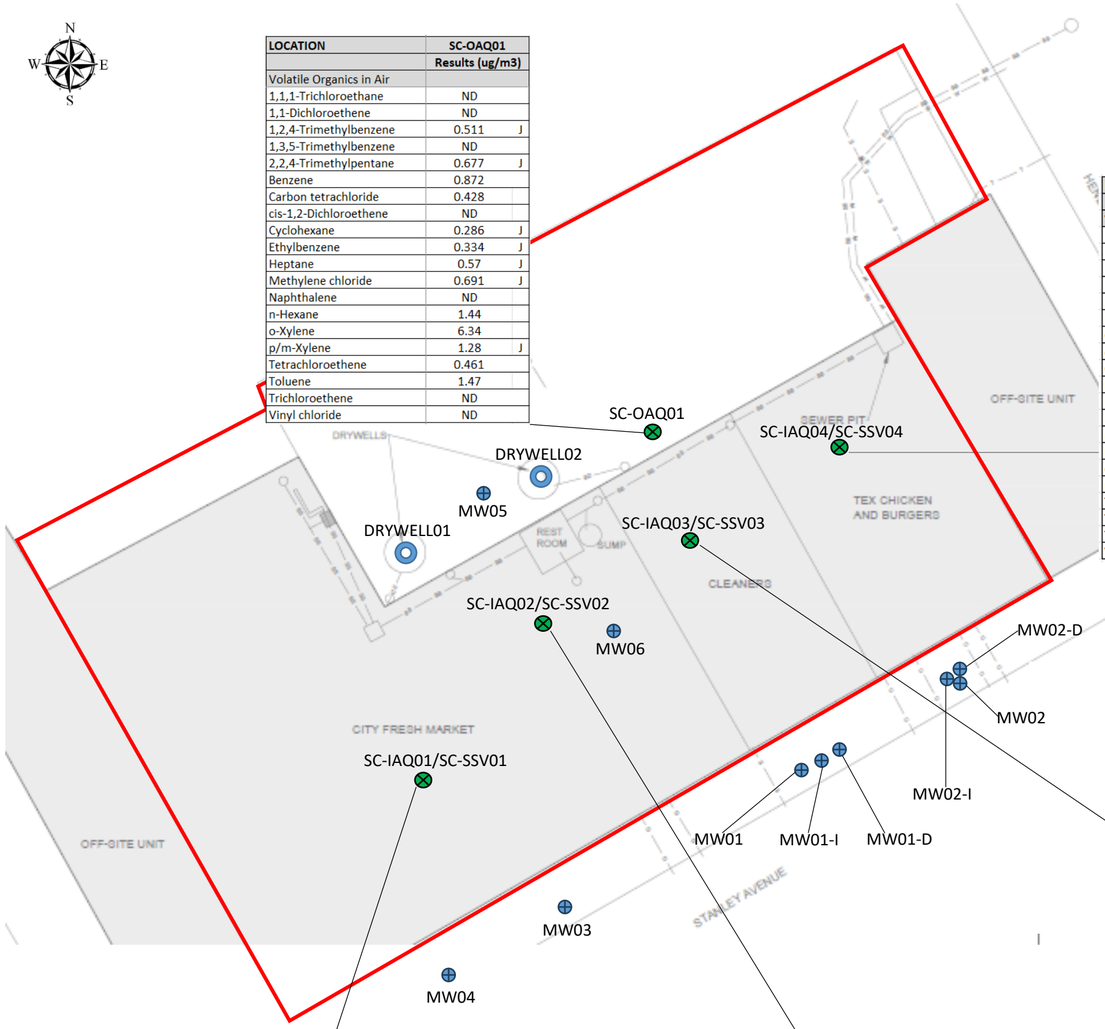
Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

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(FEET)

Figure 12
GROUNDWATER ANALYTICAL EXCEEDANCES

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL



LOCATION	SC-OAQ01	
	Results (ug/m3)	
Volatile Organics in Air		
1,1,1-Trichloroethane	ND	
1,1-Dichloroethene	ND	
1,2,4-Trimethylbenzene	0.511	J
1,3,5-Trimethylbenzene	ND	
2,2,4-Trimethylpentane	0.677	J
Benzene	0.872	
Carbon tetrachloride	0.428	
cis-1,2-Dichloroethene	ND	
Cyclohexane	0.286	J
Ethylbenzene	0.334	J
Heptane	0.57	J
Methylene chloride	0.691	J
Naphthalene	ND	
n-Hexane	1.44	
o-Xylene	6.34	
p/m-Xylene	1.28	J
Tetrachloroethene	0.461	
Toluene	1.47	
Trichloroethene	ND	
Vinyl chloride	ND	

LOCATION	NYSDOH AGVs	SC-IAQ04	SC-SSV04	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	ND	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	ND	ND	No further action
Carbon tetrachloride	~	0.434	ND	No further action
cis-1,2-Dichloroethene	~	0.297	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	0.93	16.7	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	2.03	39.8	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	ND	ND	No further action
p/m-Xylene	~	ND	ND	No further action
Tetrachloroethene	30	0.332	1640	Mitigate
Toluene	~	0.991	ND	No further action
Trichloroethene	2	ND	74.7	Mitigate
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ03	SC-SSV03	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	ND	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	ND	ND	No further action
Carbon tetrachloride	~	0.415	ND	No further action
cis-1,2-Dichloroethene	~	ND	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	ND	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	1.71	ND	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	1.26	ND	No further action
p/m-Xylene	~	ND	ND	No further action
Tetrachloroethene	30	0.359	1630	Mitigate
Toluene	~	1.64	ND	No further action
Trichloroethene	2	ND	10	No further action
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ01	SC-SSV01	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
1,2,4-Trimethylbenzene	~	1.35	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	0.7	ND	No further action
Carbon tetrachloride	~	0.478	ND	No further action
cis-1,2-Dichloroethene	~	0.091	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	1.97	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	2.27	ND	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	0.912	ND	No further action
p/m-Xylene	~	2.29	ND	No further action
Tetrachloroethene	30	1.1	1160	Mitigate
Toluene	~	7.99	ND	No further action
Trichloroethene	2	ND	11.5	No further action
Vinyl chloride	~	ND	ND	No further action

LOCATION	NYSDOH AGVs	SC-IAQ02	SC-SSV02	NYSDOH
		Results (ug/m3)	Results (ug/m3)	RECOMMENDED ACTION
Volatile Organics in Air				
1,1,1-Trichloroethane	~	ND	ND	No further action
1,1-Dichloroethene	~	ND	ND	No further action
1,2,4-Trimethylbenzene	~	1.29	ND	No further action
1,3,5-Trimethylbenzene	~	ND	ND	No further action
2,2,4-Trimethylpentane	~	ND	ND	No further action
Benzene	~	0.645	ND	No further action
Carbon tetrachloride	~	0.459	ND	No further action
cis-1,2-Dichloroethene	~	0.099	ND	No further action
Cyclohexane	~	ND	ND	No further action
Ethylbenzene	~	ND	ND	No further action
Heptane	~	1.84	ND	No further action
Methylene chloride	60	ND	ND	No further action
n-Hexane	~	0.765	6.94	No further action
Naphthalene	~	ND	ND	No further action
o-Xylene	~	0.895	ND	No further action
p/m-Xylene	~	2.27	ND	No further action
Tetrachloroethene	30	1.27	895	No further action
Toluene	~	10.6	3.39	No further action
Trichloroethene	2	ND	83.8	Mitigate
Vinyl chloride	~	ND	ND	No further action

LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 13
SOIL VAPOR INTRUSION ANALYTICAL COMPARISON

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CASTLETON ENVIRONMENTAL

TABLES

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

TABLE 1
SITE CHARACTERIZATION SAMPLE SUMMARY
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

LOCATION	MEDIA	AREA	AREA OF POTENTIAL CONCERN	VOCS	SVOCS	PESTICIDES/PCBS	METALS	1,4-DIOXANE	PFAS	DATE SAMPLED	DUPLICATE
MW01	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/7/2025	DUP
MW01-I	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/8/2025	
MW01-D	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/8/2025	
MW02	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/7/2025	
MW02-I	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/8/2025	
MW02-D	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF FORMER DRY CLEANER	x	x	x	x	x	x	4/8/2025	
MW03	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF SUPERMARKET	x	x	x	x	x	x	4/7/2025	
MW04	GROUNDWATER	SOUTHERN BORDER OF PROPERTY ALONG STANLEY AVE	DOWNGRADIENT OF SUPERMARKET	x	x	x	x	x	x	4/7/2025	
MW05	GROUNDWATER	WITHIN NORTHERN PARKING LOT	UPGRADIENT OF FORMER DRY CLEANER, ADJACENT TO STORMWTER DRYWELLS	x	x	x	x	x	x	4/7/2025	
MW06	GROUNDWATER	WITHIN SUPERMARET BASEMENT	DOWNGRDIENT OF SUMP PIT CONNECTED TO FORMER DRY CLEANER	x	x	x	x	x	x	4/7/2025	
SC-IAQ01	AMBIENT AIR	WITHIN SUPERMARKET BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	
SC-IAQ02	AMBIENT AIR	WITHIN SUPERMARKET BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	
SC-IAQ03	AMBIENT AIR	WITHIN FORMER DRY CLEANER BASEMENT	WITHIN FORMER DRY CLEANER	x						3/26/2025	DUP
SC-IAQ04	AMBIENT AIR	WITHIN TEX'S CHICKEN AND BURGERS BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	
SC-OAQ01	AMBIENT AIR	OUTDOORS IN NORTHERN PARKING LOT	BACKGROUND AMBIENT AIR	x						3/26/2025	
SC-SSV01	SUB-SLAB VAPOR	WITHIN SUPERMARKET BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	
SC-SSV02	SUB-SLAB VAPOR	WITHIN SUPERMARKET BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	
SC-SSV03	SUB-SLAB VAPOR	WITHIN FORMER DRY CLEANER BASEMENT	WITHIN FORMER DRY CLEANER	x						3/26/2025	
SC-SSV04	SUB-SLAB VAPOR	WITHIN TEX'S CHICKEN AND BURGERS BASEMENT	CROSSGRADIENT OF FORMER DRY CLEANER	x						3/26/2025	

TABLE 2
GROUNDWATER ELEVATION DATA
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

DATE:	April 7 & 8, 2025			
MW ID	Elevation (TOC)	DTW	DTB	GW Elevation
MW01	13.07	10.46	16.85	2.61
MW01-I	13.06	10.10	29.36	2.96
MW01-D	13.17	10.24	39.61	2.93
MW02	12.99	10.43	17.69	2.56
MW02-I	13.41	10.51	30.75	2.90
MW02-D	13.43	10.53	38.94	2.90
MW03	13.04	10.3	17.48	2.74
MW04	12.84	9.99	17.65	2.85
MW05	5.24	2.28	10.23	2.96
MW06	4.44	1.61	3.00	2.83

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
VOLATILE ORGANIC COMPOUNDS
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
APRIL 2025

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01				DUP(MW01)				MW01-I				MW01-D				MW02				MW02-I				MW02-D				MW03				MW04				MW05				MW06				FIELD BLANK				FIELD BLANK				TB				TRIP BLANK				TRIP BLANK2			
	LAB ID:		L2520811-02				L2520811-04				L2521121-01				L2521121-08				L2520811-01				L2521121-09				L2521121-11				L2521121-04				L2521121-05				L2521121-06				L2521121-07				L2520811-03				L2521121-10				L2521121-02				L2521121-03			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/8/2025				3/21/2025				3/21/2025			
	SAMPLE DEPTH:																																																											
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	CAS	(ug/l)	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
VOLATILE ORGANICS BY GC/MS																																																															
Methylene chloride	75-09-2	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,1-Dichloroethane	75-34-3	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Chloroform	67-66-3	7	2.6		2.5	0.7	3		2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.97	J	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Carbon tetrachloride	56-23-5	5	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13
1,2-Dichloropropane	78-87-5	1	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14
Dibromochloromethane	124-48-1	50	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15	0.15	U	0.5	0.15
1,1,2-Trichloroethane	79-00-5	1	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5	0.5	U	1.5	0.5
Tetrachloroethene	127-18-4	5	9.2		0.5	0.18	8.9		0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	5.4		0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	2.5		0.5	0.18	1.4		0.5	0.18	0.82		0.5	0.18	2.6		0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18
Chlorobenzene	108-90-7	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Trichlorofluoromethane	75-69-4	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,2-Dichloroethane	107-06-2	0.6	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13	0.13	U	0.5	0.13
1,1,1-Trichloroethane	71-55-6	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Bromodichloromethane	75-27-4	50	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19	0.19	U	0.5	0.19
trans-1,3-Dichloropropene	10061-02-6	0.4	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16
cis-1,3-Dichloropropene	10061-01-5	0.4	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14
1,3-Dichloropropene, Total	542-75-6	~	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14	0.14	U	0.5	0.14
1,1-Dichloropropene	563-58-6	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Bromoform	75-25-2	50	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65
1,1,2,2-Tetrachloroethane	79-34-5	5	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17
Benzene	71-43-2	1	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	1.7		0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16
Toluene	108-88-3	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Ethylbenzene	100-41-4	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Chloromethane	74-87-3	~	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Bromomethane	74-83-9	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Vinyl chloride	75-01-4	2	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07	0.07	U	1	0.07
Chloroethane	75-00-3	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,1-Dichloroethene	75-35-4	5	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17	0.17	U	0.5	0.17
trans-1,2-Dichloroethene	156-60-5	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Trichloroethene	79-01-6	5	0.69		0.5	0.18	0.62		0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.19	J	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.26	J	0.5	0.18	0.18	U	0.5	0.18	0.22	J	0.5	0.18	0.5		0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18	0.18	U	0.5	0.18
1,2-Dichlorobenzene	95-50-1	3	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,3-Dichlorobenzene	541-73-1	3	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,4-Dichlorobenzene	106-46-7	3	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Methyl tert butyl ether	1634-04-4	10	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17	0.17	U	2.5	0.17
p/m-Xylene	179601-23-1	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
o-Xylene	95-47-6	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Xylenes, Total	1330-20-7	~	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
cis-1,2-Dichloroethene	156-59-2	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
1,2-Dichloroethene, Total	540-59-0	~	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Dibromomethane	74-95-3	5	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1
1,2,3-Trichloropropane	96-18-4	0.04	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Acrylonitrile	107-13-1	5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5	1.5	U	5	1.5
Styrene	100-42-5	5	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7	0.7	U	2.5	0.7
Dichlorodifluoromethane	75-71-8	5	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1
Carbon disulfide	75-15-0	60	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1
2-Butanone	78-93-3	50	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9	1.9	U	5	1.9
Vinyl acetate	108-05-4	~	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1
4-Methyl-2-pentanone	108-10-1	~	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5

TABLE 3 (continued)
GROUNDWATER ANALYTICAL SUMMARY
SEMI-VOLATILE ORGANIC COMPOUNDS
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
APRIL 2025

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01				DUP(MW01)				MW01-I				MW01-D				MW02				MW02-I				MW02-D				MW03				MW04				MW05				MW06				FIELD BLANK				FIELD BLANK			
	LAB ID:		L2520811-02				L2520811-04				L2521121-01				L2521121-08				L2520811-01				L2521121-09				L2521121-11				L2521121-04				L2521121-05				L2521121-06				L2521121-07				L2520811-03				L2521121-10			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/8/2025			
	SAMPLE DEPTH:																																																		
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	**CAS**	**(ug/l)**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
SEMIVOLATILE ORGANICS BY GC/MS																																																				
1,2,4-Trichlorobenzene	120-82-1	5	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98	0.98	U	5	0.98
Bis(2-chloroethyl)ether	111-44-4	1	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39
1,2-Dichlorobenzene	95-50-1	3	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33	0.33	U	2	0.33
1,3-Dichlorobenzene	541-73-1	3	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32	0.32	U	2	0.32
1,4-Dichlorobenzene	106-46-7	3	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39
3,3'-Dichlorobenzidine	91-94-1	5	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8	1.8	U	5	1.8
2,4-Dinitrotoluene	121-14-2	5	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54	0.54	U	5	0.54
2,6-Dinitrotoluene	606-20-2	5	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84
4-Chlorophenyl phenyl ether	7005-72-3	~	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39	0.39	U	2	0.39
4-Bromophenyl phenyl ether	101-55-3	~	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24	0.24	U	2	0.24
Bis(2-chloroisopropyl)ether	108-60-1	5	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4
Bis(2-chloroethoxy)methane	111-91-1	5	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84	0.84	U	5	0.84
Hexachlorocyclopentadiene	77-47-4	5	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2	1.2	U	20	1.2
Isophorone	78-59-1	50	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86	0.86	U	5	0.86
Nitrobenzene	98-95-3	0.4	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2
NDPA/DPA	86-30-6	50	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92	0.92	U	2	0.92
n-Nitrosodi-n-propylamine	621-64-7	~	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91	0.91	U	5	0.91
Bis(2-ethylhexyl)phthalate	117-81-7	5	2.1	J	3	1.4	2	J	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	4		3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	1.4	U	3	1.4	2.1	J	3	1.4	3.1		3	1.4
Butyl benzyl phthalate	85-68-7	50	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6	2.6	U	5	2.6
Di-n-butylphthalate	84-74-2	50	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96	0.96	U	5	0.96
Di-n-octylphthalate	117-84-0	50	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3
Diethyl phthalate	84-66-2	50	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76	0.76	U	5	0.76
Dimethyl phthalate	131-11-3	50	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92
Biphenyl	92-52-4	~	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2	0.2	U	2	0.2
4-Chloroaniline	106-47-8	5	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47	0.47	U	5	0.47
2-Nitroaniline	88-74-4	5	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1	1	U	5	1
3-Nitroaniline	99-09-2	5	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2	1.2	U	5	1.2
4-Nitroaniline	100-01-6	5	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4
Dibenzofuran	132-64-9	~	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4	0.4	U	2	0.4
1,2,4,5-Tetrachlorobenzene	95-94-3	5	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24	0.24	U	10	0.24
Acetophenone	98-86-2	~	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92	0.92	U	5	0.92
2,4,6-Trichlorophenol	88-06-2	~	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1
p-Chloro-m-cresol	59-50-7	~	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61	0.61	U	2	0.61
2-Chlorophenol	95-57-8	~	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65	0.65	U	2	0.65
2,4-Dichlorophenol	120-83-2	1	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7	1.7	U	5	1.7
2,4-Dimethylphenol	105-67-9	50	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2	2	U	5	2
2-Nitrophenol	88-75-5	~	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2	2	U	10	2
4-Nitrophenol	100-02-7	~	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4	1.4	U	10	1.4
2,4-Dinitrophenol	51-28-5	10	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4	5.4	U	20	5.4
4,6-Dinitro-o-cresol	534-52-1	~	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3	2.3	U	10	2.3
Phenol	108-95-2	1	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35	0.35	U	5	0.35
2-Methylphenol	95-48-7	~	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3	2.3	U	5	2.3
3-Methylphenol/4-Methylphenol	108-39-4/106-44-5	~	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4	1.4	U	5	1.4
2,4,5-Trichlorophenol	95-95-4	~	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1	2.1	U	5	2.1
Benzoic Acid	65-85-0	~	4	J	50	2.6	2.7	J	50	2.6	2.6	U	50	2.6	7.3	J	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6	7.1	J	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6	2.6	U	50	2.6
Benzyl Alcohol	100-51-6	~	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38	0.38	U	2	0.38
Carbazole	86-74-8	~	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31	0.31	U	2	0.31
SEMIVOLATILE ORGANICS BY GC/MS-SIM																																																				
Acenaphthene	83-32-9	20	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02
2-Chloronaphthalene	91-58-7	10	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02	0.02	U	0.2	0.02
Fluoranthene	206-44-0	50	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	J	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03
Hexachlorobutadiene	87-68-3	0.5	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02	0.02	U	0.5	0.02
Naphthalene	91-20-3	10	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02
Benzo(a)anthracene	56-55-3	0.002	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.04	J	0.1	0.03	0.03	U	0.1	0.03	0.03	J	0.1	0.03	0.03	U	0.1	0.03	0.03	J	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03
Benzo(a)pyrene	50-32-8	0	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02	0.02	U	0.1	0.02
Benzo(b)fluoranthene	205-99-2	0.002	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03
Benzo(k)fluoranthene	207-08-9	0.002	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03	U	0.1	0.03	0.03

TABLE 3 (continued)
GROUNDWATER ANALYTICAL SUMMARY
1,4 DIOXANE
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
APRIL 2025

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01				DUP(MW01)				MW01-I				MW01-D				MW02				MW02-I				MW02-D				MW03				MW03			
	LAB ID:		L2520811-02				L2520811-04				L2521121-01				L2521121-08				L2520811-01				L2521121-09				L2521121-11				L2521121-04				L2521121-04 R1			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/7/2025			
	SAMPLE DEPTH:																																					
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	**CAS**	**(ug/l)**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
1,4 DIOXANE BY 8270E-SIM																																						
1,4-Dioxane	123-91-1	0.35	0.0339	U	0.15	0.034	0.0326	U	0.144	0.033	0.099	J	0.144	0.033	0.127	J	0.142	0.032	0.032	U	0.142	0.032	0.151	J	0.156	0.035	0.146	J	0.153	0.035	0.032	U	0.142	0.032	0.0326	U	0.144	0.033

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW04				MW04				MW05				MW05				MW06				MW06				FIELD BLANK				FIELD BLANK			
	LAB ID:		L2521121-05				L2521121-05 R1				L2521121-06				L2521121-06 R1				L2521121-07				L2521121-07 R1				L2520811-03				L2521121-10			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/8/2025			
	SAMPLE DEPTH:																																			
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	**CAS**	**(ug/l)**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
1,4 DIOXANE BY 8270E-SIM																																				
1,4-Dioxane	123-91-1	0.35	0.0353	U	0.156	0.035	0.0326	U	0.144	0.033	0.0332	U	0.147	0.033	0.0326	U	0.144	0.033	0.225		0.144	0.033	0.145		0.144	0.033	0.0326	U	0.144	0.033	0.0339	U	0.15	0.034				

Notes:
Gray highlight designates that the compound detection limit was reported above the applicable criteria
Yellow highlight designated exceedance of the applicable criteria
J - Presumptive evidence of compound reported above the method detection limit but below the reporting limit.
U - Not detected

TABLE 3 (continued)
GROUNDWATER ANALYTICAL SUMMARY
PFAS
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
APRIL 2025

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01						DUP						MW01-I						MW01-D					
	LAB ID:		L2520812-02						L2520812-04						L2521121-01						L2521121-08					
	COLLECTION DATE:		4/7/2025						4/7/2025						4/8/2025						4/8/2025					
	SAMPLE DEPTH:																									
	SAMPLE MATRIX:		WATER						WATER						WATER						WATER					
ANALYTE	CAS	(ug/l)	Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL	
PERFLUORINATED ALKYL ACIDS BY EPA 1633																										
Perfluorobutanoic Acid (PFBA)	375-22-4	~	0.0197		0.00668		0.000551		0.0143		0.00667		0.00055		0.013		0.00634		0.000523		0.0121		0.00591		0.000488	
Perfluoropentanoic Acid (PFPeA)	2706-90-3	~	0.0154		0.00334		0.000376		0.0168		0.00334		0.000375		0.0219		0.00317		0.000357		0.0192		0.00296		0.000333	
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	~	0.00499		0.00167		0.000418		0.00493		0.00167		0.000417		0.00825		0.00158		0.000396		0.00639		0.00148		0.00037	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	~	0.000952	U	0.00668		0.000952		0.00095	U	0.00667		0.00095		0.000904	U	0.00634		0.000904		0.000843	U	0.00591		0.000843	
Perfluorohexanoic Acid (PFHxA)	307-24-4	~	0.0136		0.00167		0.000259		0.0134		0.00167		0.000258		0.0166		0.00158		0.000246		0.0146		0.00148		0.000229	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	~	0.000559	J	0.00167		0.000217		0.0006	J	0.00167		0.000217		0.000674	J	0.00158		0.000206		0.000916	J	0.00148		0.000192	
Perfluoroheptanoic Acid (PFHpA)	375-85-9	~	0.0105		0.00167		0.00025		0.0115		0.00167		0.00025		0.0118		0.00158		0.000238		0.0109		0.00148		0.000222	
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	~	0.0029		0.00167		0.000142		0.00278		0.00167		0.000142		0.00495		0.00158		0.000135		0.00627		0.00148		0.000126	
Perfluorooctanoic Acid (PFOA)	335-67-1	0.0067	0.054		0.00167		0.000276		0.0509		0.00167		0.000275		0.0624		0.00158		0.000262		0.0571		0.00148		0.000244	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	~	0.00503	U	0.00668		0.00503		0.00502	U	0.00667		0.00502		0.00477	U	0.00634		0.00477		0.00445	U	0.00591		0.00445	
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	~	0.000843	J	0.00167		0.000209		0.0007	J	0.00167		0.000208		0.000808	J	0.00158		0.000198		0.000613	J	0.00148		0.000185	
Perfluorononanoic Acid (PFNA)	375-95-1	~	0.0079		0.00167		0.000276		0.00806		0.00167		0.000275		0.00383		0.00158		0.000262		0.00303		0.00148		0.000244	
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.0027	0.0541		0.00167		0.000276		0.0547		0.00167		0.000275		0.028		0.00158		0.000262		0.019		0.00148		0.000244	
Perfluorodecanoic Acid (PFDA)	335-76-2	~	0.00149	J	0.00167		0.000217		0.00181		0.00167		0.000217		0.000206	U	0.00158		0.000206		0.000266	J	0.00148		0.000192	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	~	0.00128	U	0.00668		0.00128		0.00128	U	0.00667		0.00128		0.00121	U	0.00634		0.00121		0.00113	U	0.00591		0.00113	
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	~	0.000209	U	0.00167		0.000209		0.000208	U	0.00167		0.000208		0.000198	U	0.00158		0.000198		0.000185	U	0.00148		0.000185	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	~	0.000501	U	0.00167		0.000501		0.0005	U	0.00167		0.0005		0.000476	U	0.00158		0.000476		0.000443	U	0.00148		0.000443	
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	~	0.000184	U	0.00167		0.000184		0.000183	U	0.00167		0.000183		0.000174	U	0.00158		0.000174		0.000163	U	0.00148		0.000163	
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	~	0.000142	U	0.00167		0.000142		0.000142	U	0.00167		0.000142		0.000135	U	0.00158		0.000135		0.000126	U	0.00148		0.000126	
Perfluorooctanesulfonamide (PFOSA)	754-91-6	~	0.00221	F	0.00167		0.0001		0.00258	F	0.00167		0.0001		0.000095	U	0.00158		0.000095		0.000089	U	0.00148		0.000089	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	~	0.00172		0.00167		0.000501		0.00152	JF	0.00167		0.0005		0.000476	U	0.00158		0.000476		0.000443	U	0.00148		0.000443	
Perfluorododecanoic Acid (PFDoA)	307-55-1	~	0.000225	U	0.00167		0.000225		0.000225	U	0.00167		0.000225		0.000214	U	0.00158		0.000214		0.0002	U	0.00148		0.0002	
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	~	0.000192	U	0.00167		0.000192		0.000192	U	0.00167		0.000192		0.000182	U	0.00158		0.000182		0.00017	U	0.00148		0.00017	
Perfluorotetradecanoic Acid (PFTeDA)	376-06-7	~	0.000167	U	0.00167		0.000167		0.000167	U	0.00167		0.000167		0.000158	U	0.00158		0.000158		0.000148	U	0.00148		0.000148	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	13252-13-6	~	0.00167	U	0.00668		0.00167		0.00167	U	0.00667		0.00167		0.00158	U	0.00634		0.00158		0.00148	U	0.00591		0.00148	
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	~	0.000392	U	0.00668		0.000392		0.000392	U	0.00667		0.000392		0.000372	U	0.00634		0.000372		0.000347	U	0.00591		0.000347	
Perfluorododecanesulfonic Acid (PFDoS)	79780-39-5	~	0.00025	U	0.00167		0.00025		0.00025	U	0.00167		0.00025		0.000238	U	0.00158		0.000238		0.000222	U	0.00148		0.000222	
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	756426-58-1	~	0.000459	U	0.00668		0.000459		0.000458	U	0.00667		0.000458		0.000436	U	0.00634		0.000436		0.000406	U	0.00591		0.000406	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	763051-92-9	~	0.000468	U	0.00668		0.000468		0.000467	U	0.00667		0.000467		0.000444	U	0.00634		0.000444		0.000414	U	0.00591		0.000414	
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	~	0.000234	U	0.00167		0.000234		0.000233	U	0.00167		0.000233		0.000222	U	0.00158		0.000222		0.000207	U	0.00148		0.000207	
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	~	0.000367	U	0.00167		0.000367		0.000367	U	0.00167		0.000367		0.000349	U	0.00158		0.000349		0.000325	U	0.00148		0.000325	
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	~	0.00136	U	0.0167		0.00136		0.00136	U	0.0167		0.00136		0.00129	U	0.0158		0.00129		0.0012	U	0.0148		0.0012	
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	~	0.00115	U	0.0167		0.00115		0.00115	U	0.0167		0.00115		0.00109	U	0.0158		0.00109		0.00102	U	0.0148		0.00102	
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	~	0.000259	U	0.00334		0.000259		0.000258	U	0.00334		0.000258		0.000246	U	0.00317		0.000246		0.000229	U	0.00296		0.000229	
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	~	0.000376	U	0.00334		0.000376		0.000375	U	0.00334		0.000375		0.000357	U	0.00317		0.000357		0.000333	U	0.00296		0.000333	
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	~	0.000342	U	0.00334		0.000342		0.000342	U	0.00334		0.000342		0.000325	U	0.00317		0.000325		0.000303	U	0.00296		0.000303	
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	~	0.000568	U	0.00334		0.000568		0.000567	U	0.00334		0.000567		0.000539	U	0.00317		0.000539		0.000503	U	0.00296		0.000503	
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	~	0.000559	U	0.00835		0.000559		0.000559	U	0.00834		0.000559		0.000531	U	0.00793		0.000531		0.000495	U	0.00739		0.000495	
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	~	0.00444	U	0.0418		0.00444		0.00444	U	0.0417		0.00444		0.00422	U	0.0396		0.00422		0.00393	U	0.037		0.00393	
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	~	0.00332	U	0.0418		0.00332		0.00332	U	0.0417		0.00332		0.00315	U	0.0396		0.00315		0.00294	U	0.037		0.00294	

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW02						MW02-I						MW02-D						MW03					
	LAB ID:		L2520812-01						L2521121-09						L2521121-11						L2521121-04					
	COLLECTION DATE:		4/7/2025						4/8/2025						4/8/2025						4/7/2025					
	SAMPLE DEPTH:																									
	SAMPLE MATRIX:		WATER						WATER						WATER						WATER					
ANALYTE	CAS	(ug/l)	Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL	
PERFLUORINATED ALKYL ACIDS BY EPA 1633																										
Perfluorobutanoic Acid (PFBA)	375-22-4	~	0.00797		0.00623		0.000514		0.00913		0.00626		0.000517		0.00974		0.00603		0.000497		0.00769		0.00617		0.000509	
Perfluoropentanoic Acid (PFPeA)	2706-90-3	~	0.01		0.00311		0.00035		0.0171		0.00313		0.000352		0.0229		0.00301		0.000339		0.0154		0.00308		0.000347	
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	~	0.00497		0.00156		0.000389		0.0065		0.00156		0.000391		0.0064		0.00151		0.000377		0.00419		0.00154		0.000385	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	~	0.000888	U	0.00623		0.000888		0.000892	U	0.00626		0.000892		0.000859	U	0.00603		0.000859		0.000879	U	0.00617		0.000879	
Perfluorohexanoic Acid (PFHxA)	307-24-4	~	0.0131		0.00156		0.000241		0.0136		0.00156		0.000243		0.0168		0.00151		0.000234		0.0149		0.00154		0.000239	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	~	0.00067	J	0.00156		0.000202		0.000783	J	0.00156		0.000204		0.000806	J	0.00151		0.000196		0.000559	J	0.00167		0.000217	
Perfluoroheptanoic Acid (PFHpA)	375-85-9	~	0.0109		0.00156		0.000234		0.00917		0.00156		0.000235		0.0116		0.00151		0.000226		0.0105		0.00167		0.00025	
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	~	0.0059		0.00156		0.000132		0.0059		0.00156		0.000133		0.0055		0.00151		0.000128		0.0029		0.00167		0.000142	
Perfluorooctanoic Acid (PFOA)	335-67-1	0.0067	0.0621		0.00156		0.000257		0.0526		0.00156		0.000258		0.0578		0.00151		0.000249		0.054		0.00167		0.000276	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	~	0.0169		0.00623		0.00469		0.00471	U	0.00626		0.00471		0.00454	U	0.00603		0.00454		0.00503	U	0.00668		0.00503	
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	~	0.00121	J	0.00156		0.000195		0.000634	J	0.00156		0.000196		0.00058	J	0.00151		0.000188		0.000843	J	0.00167		0.000209	
Perfluorononanoic Acid (PFNA)	375-95-1	~	0.00475		0.00156		0.000257		0.00251		0.00156		0.000258		0.00328		0.00151		0.000249		0.0079		0.00167		0.000276	
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.0027	0.0317		0.00156		0.000257		0.0206		0.00156		0.000258		0.0242		0.00151		0.000242		0.0541		0.00167		0.000276	
Perfluorodecanoic Acid (PFDA)	335-76-2	~	0.000553	J	0.00156		0.000202		0.000368	J	0.00156		0.000204		0.000505	J	0.00151		0.000196		0.00149	J	0.00167		0.000217	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	~	0.00119	U	0.00623		0.00119		0.0012	U	0.00626		0.0012		0.00115	U	0.00603		0.00115		0.00128	U	0.00668		0.00128	
Perfluorononanesulfonic Acid (PFNS)	68259-12-1	~	0.000195	U	0.00156		0.000195		0.000196	U	0.00156		0.000196		0.000188	U	0.00151		0.000188		0.000209	U	0.00167		0.000209	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9	~	0.000467	U	0.00156		0.000467		0.00047	U	0.00156		0.00047		0.000452	U	0.00151		0.000452		0.000501	U	0.00167		0.000501	
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	~	0.000171	U	0.00156		0.000171		0.000172	U	0.00156		0.000172		0.000166	U	0.00151		0.000166		0.000184	U	0.00167		0.000184	
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	~	0.000132	U	0.00156		0.000132		0.000133	U	0.00156		0.000133		0.000128	U	0.00151		0.000128		0.000142	U	0.00167		0.000142	
Perfluorooctanesulfonamide (PFOSA)	754-91-6	~	0.000195	J	0.00156		0.000093		0.000094	U	0.00156		0.000094		0.000136	J	0.00151		0.000093		0.00221	F	0.00167		0.0001	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	~	0.000467	U	0.00156		0.000467		0.00047	U	0.00156		0.00047		0.000452	U	0.00151		0.000452		0.00172		0.00167		0.000501	
Perfluorododecanoic Acid (PFDoA)	307-55-1	~	0.00021	U	0.00156		0.000211		0.00021	U	0.00156		0.000211		0.000203	U	0.00151		0.000203		0.000225	U	0.00167		0.000225	
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	~	0.000179	U	0.00156		0.000179		0.00018	U	0.00156		0.00018		0.000173	U	0.00151		0.000173		0.000192	U	0.00167		0.000192	
Perfluorotetradecanoic Acid (PFTeDA)	376-06-7	~	0.000156	U	0.00156		0.000156		0.000151	U	0.00156		0.000151		0.000151	U	0.00151		0.000151		0.000167	U	0.00167		0.000167	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	13252-13-6	~	0.00156	U	0.00623		0.00156		0.00156	U	0.00626		0.00156		0.00151	U	0.00603		0.00151		0.00167	U	0.00668		0.00167	
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	919005-14-4	~	0.000366	U	0.00623		0.000366		0.000368	U	0.00626		0.000368		0.000354	U	0.00603		0.000354		0.000392	U	0.00668		0.000392	
Perfluorododecanesulfonic Acid (PFDoS)	79780-39-5	~	0.000234	U	0.00156		0.000235		0.000226	U	0.00156		0.000235		0.000226	U	0.00151		0.000226		0.00025	U	0.00167		0.00025	
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	756426-58-1	~	0.000428	U	0.00623		0.000428		0.00043	U	0.00626		0.00043		0.000414	U	0.00603		0.000414		0.000459	U	0.00668		0.000459	
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	763051-92-9	~	0.000436	U	0.00623		0.000436		0.000438	U	0.00626		0.000438		0.000422	U	0.00603		0.000422		0.000468	U	0.00668		0.000468	
N-Methyl Perfluorooctane Sulfonamide (NMeFOSA)	31506-32-8	~	0.000218	U	0.00156		0.000218		0.000219	U	0.00156		0.000219		0.000211	U	0.00151		0.000211		0.000234	U	0.00167		0.000234	
N-Ethyl Perfluorooctane Sulfonamide (NEtFOSA)	4151-50-2	~	0.000342	U	0.00156		0.000342		0.000344	U	0.00156		0.000344		0.000332	U	0.00151		0.000332		0.000367	U	0.00167		0.000367	
N-Methyl Perfluorooctanesulfonamido Ethanol (NMeFOSE)	24448-09-7	~	0.00127	U	0.0156		0.00127		0.00128	U	0.0156		0.00128		0.00123	U	0.0151		0.00123		0.00136	U	0.0167		0.00136	
N-Ethyl Perfluorooctanesulfonamido Ethanol (NEtFOSE)	1691-99-2	~	0.00107	U	0.0156		0.00107		0.00108	U	0.0156		0.00108		0.00104	U	0.0151		0.00104		0.00115	U	0.0167		0.00115	
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	377-73-1	~	0.000241	U	0.00311		0.000241		0.000243	U	0.00313		0.000243		0.000234	U	0.00301		0.000234		0.000259	U	0.00334		0.000259	
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	863090-89-5	~	0.00035	U	0.00311		0.00035		0.000352	U	0.00313		0.000352		0.000339	U	0.00301		0.000339		0.000376	U	0.00334		0.000376	
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	113507-82-7	~	0.000319	U	0.00311		0.000319		0.000321	U	0.00313		0.000321		0.000309	U	0.00301		0.000309		0.000342	U	0.00334		0.000342	
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	151772-58-6	~	0.000529	U	0.00311		0.000529		0.000532	U	0.00313		0.000532		0.000512	U	0.00301		0.000512		0.000568	U	0.00334		0.000568	
3-Perfluoropropyl Propanoic Acid (3:3FTCA)	356-02-5	~	0.000524	U	0.00778		0.000522		0.000524	U	0.00783		0.000524		0.000505	U	0.00753		0.000505		0.000559	U	0.00835		0.000559	
2H,2H,3H,3H-Perfluorooctanoic Acid (5:3FTCA)	914637-49-3	~	0.00411	U	0.0386		0.00411		0.00408	U	0.0384		0.00408		0.00408	U	0.0384		0.00408		0.00444	U	0.0418		0.00444	
3-Perfluoroheptyl Propanoic Acid (7:3FTCA)	812-70-4	~	0.00307	U	0.0386		0.00307		0.00306	U	0.0384		0.00306		0.00306	U	0.0384		0.00306		0.00332	U	0.0418		0.00332	

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW04						MW05						MW06						FIELD BLANK						FIELD BLANK					
	LAB ID:		L2521121-05						L2521121-06						L2521121-07						L2520812-03						L2521121-10					
	COLLECTION DATE:		4/7/2025						4/7/2025						4/7/2025						4/7/2025						4/8/2025					
	SAMPLE DEPTH:																															
	SAMPLE MATRIX:		WATER						WATER						WATER						WATER						WATER					
		NY-AWQS																														
ANALYTE	CAS	(ug/l)	Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL		Conc	Q	RL		MDL	
PERFLUORINATED ALKYL ACIDS BY EPA 1633																																
Perfluorobutanoic Acid (PFBA)	375-22-4	~	0.00769		0.00617		0.000509		0.0113		0.00654		0.00054		0.00681		0.00632		0.000521		0.0337		0.00581		0.000479		0.00051	U	0.00618		0.00051		0.000507	U	0.00614		0.000507	
Perfluoropentanoic Acid (PFPeA)	2706-90-3	~	0.0154		0.00308		0.000347		0.0164		0.00327		0.000368		0.013		0.00316		0.000355		0.0676		0.0029		0.000327		0.000348	U	0.00309		0.000348		0.000346	U	0.00307		0.000346	
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	~	0.00419		0.00154		0.000385		0.00828		0.00164		0.000409		0.0043		0.00158		0.000395		0.00709		0.00145		0.000363		0.000386	U	0.00154		0.000386		0.000384	U	0.00154		0.000384	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	757124-72-4	~	0.000879	U	0.00617		0.000879		0.000932	U	0.00654		0.000932		0.0009	U	0.00632		0.0009		0.000828	U	0.00581		0.000828		0.000881	U	0.00618		0.000881		0.000876	U	0.00614		0.000876	
Perfluorohexanoic Acid (PFHxA)	307-24-4	~	0.0149		0.00154		0.000239		0.0123		0.00164		0.000254		0.00936		0.00158		0.000245		0.0434		0.00145		0.000225		0.000239	U	0.00154		0.000239		0.000238	U	0.00154		0.000238	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	~	0.000694	J	0.00154		0.0002		0.000859	J	0.00164		0.000213		0.000474	J	0.00158		0.000205		0.00037	J	0.00145		0.000189		0.000201	U	0.00154		0.000201		0.0002	U	0.00154		0.0002	
Perfluoroheptanoic Acid (PFHpA)	375-85-9	~	0.00774		0.00154		0.000231		0.0103		0.00164		0.000245		0.00919		0.00158		0.000237		0.0156		0.00145		0.000218		0.000232	U	0.00154		0.000232		0.00023	U	0.00154		0.00023	
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	~	0.00263		0.00154		0.000131		0.00451		0.00164		0.000139		0.00227		0.00158		0.000134		0.00403		0.00145		0.000123		0.000131	U	0.00154		0.000131		0.00013	U	0.00154		0.00013	
Perfluorooctanoic Acid (PFOA)	335-67-1	0.0067	0.0343		0.00154		0.000254		0.0459		0.00164		0.00027		0.0316		0.00158		0.00026		0.0628		0.00145		0.00024		0.000255	U	0.00154		0.000255		0.000253	U	0.00154		0.000253	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	~	0.0092		0.00617		0.00464		0.00492	U	0.00654		0.00492		0.00475	U	0.00632		0.00475		0.00437	U	0.00581		0.00437		0.00465	U	0.00618		0.00465		0.00462	U	0.00614		0.00462	
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	~	0.000401	J	0.00154		0.000193		0.000638	J	0.00164		0.000204		0.00157	J	0.00158		0.000197		0.00293		0.00145		0.000182		0.000193	U	0.00154		0.000193		0.000192	U	0.00154		0.000192	
Perfluorononanoic Acid (PFNA)	375-95-1	~	0.00271		0.00154		0.000254		0.0026		0.00164		0.00027		0.0102		0.00158		0.00026		0.0168		0.00145		0.00024		0.000255	U	0.00154		0.000255		0.000253	U	0.00154		0.000253	
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	0.0027	0.0279		0.00154		0.000254		0.0377		0.00164		0.00027		0.0837		0.00158		0.00026		0.0643		0.00145		0.00024		0.000255	U	0.00154		0.000255		0.000253	U	0.00154		0.000253	
Perfluorodecanoic Acid (PFDA)	335-76-2	~	0.000686	JF	0.00154		0.0002		0.000417	J	0.00164		0.000213		0.00298		0.00158		0.000205		0.00167		0.00145		0.000189		0.000201	U	0.00154		0.000201		0.0002	U	0.00154		0.0002	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	~	0.00118	U	0.00617		0.00118		0.00125	U	0.00654		0.00125		0.00121	U	0.00632		0.00121		0.00111	U	0.00581		0.00111		0.00118

TABLE 3 (continued)
GROUNDWATER ANALYTICAL SUMMARY
PESTICIDES/PCBS
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01				DUP(MW01)				MW01-I				MW01-D				MW02				MW02-I				MW02-D			
	LAB ID:		L2520811-02				L2520811-04				L2521121-01				L2521121-08				L2520811-01				L2521121-09				L2521121-11			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/8/2025				4/8/2025			
	SAMPLE DEPTH:																													
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	**CAS**	**(ug/l)**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
ORGANOCHLORINE PESTICIDES BY GC																														
Delta-BHC	319-86-8	0.04	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006
Lindane	58-89-9	0.05	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Alpha-BHC	319-84-6	0.01	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Beta-BHC	319-85-7	0.04	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014
Heptachlor	76-44-8	0.04	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Aldrin	309-00-2	0.004	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Heptachlor epoxide	1024-57-3	0.03	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Endrin	72-20-8	ND	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008
Endrin aldehyde	7421-93-4	5	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018
Endrin ketone	53494-70-5	5	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014
Dieldrin	60-57-1	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.011	J	0.029	0.004	0.006	J	0.029	0.004
4,4'-DDE	72-55-9	0.2	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01
4,4'-DDD	72-54-8	0.3	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01
4,4'-DDT	50-29-3	0.2	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013
Endosulfan I	959-98-8	~	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Endosulfan II	33213-65-9	~	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008
Endosulfan sulfate	1031-07-8	~	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007
Methoxychlor	72-43-5	35	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014
Toxaphene	8001-35-2	0.06	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094
cis-Chlordane	5103-71-9	~	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007
trans-Chlordane	5103-74-2	~	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011
Chlordane	57-74-9	0.05	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098
POLYCHLORINATED BIPHENYLS BY GC																														
Aroclor 1016	12674-11-2	0.09	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013
Aroclor 1221	11104-28-2	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1232	11141-16-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1242	53469-21-9	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1248	12672-29-6	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1254	11097-69-1	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1260	11096-82-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1262	37324-23-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1268	11100-14-4	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
PCBs, Total	1336-36-3	~	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW03				MW04				MW05				MW06				FIELD BLANK				FIELD BLANK			
	LAB ID:		L2521121-04				L2521121-05				L2521121-06				L2521121-07				L2520811-03				L2521121-10			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/8/2025			
	SAMPLE DEPTH:																									
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER			
ANALYTE	**CAS**	**(ug/l)**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
ORGANOCHLORINE PESTICIDES BY GC																										
Delta-BHC	319-86-8	0.04	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006	0.006	U	0.014	0.006
Lindane	58-89-9	0.05	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Alpha-BHC	319-84-6	0.01	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Beta-BHC	319-85-7	0.04	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014	0.014	U	0.02	0.014
Heptachlor	76-44-8	0.04	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Aldrin	309-00-2	0.004	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Heptachlor epoxide	1024-57-3	0.03	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Endrin	72-20-8	ND	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008
Endrin aldehyde	7421-93-4	5	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018	0.018	U	0.03	0.018
Endrin ketone	53494-70-5	5	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014	0.014	U	0.029	0.014
Dieldrin	60-57-1	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004	0.004	U	0.029	0.004
4,4'-DDE	72-55-9	0.2	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01
4,4'-DDD	72-54-8	0.3	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01	0.01	U	0.029	0.01
4,4'-DDT	50-29-3	0.2	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.013	U	0.029	0.013	0.015	J	0.029	0.013	0.013	U	0.029	0.013
Endosulfan I	959-98-8	~	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005	0.005	U	0.014	0.005
Endosulfan II	33213-65-9	~	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008	0.008	U	0.029	0.008
Endosulfan sulfate	1031-07-8	~	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007	0.007	U	0.029	0.007
Methoxychlor	72-43-5	35	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014	0.014	U	0.143	0.014
Toxaphene	8001-35-2	0.06	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094	0.094	U	0.2	0.094
cis-Chlordane	5103-71-9	~	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007	0.007	U	0.02	0.007
trans-Chlordane	5103-74-2	~	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011	0.011	U	0.02	0.011
Chlordane	57-74-9	0.05	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098	0.098	U	0.143	0.098
POLYCHLORINATED BIPHENYLS BY GC																										
Aroclor 1016	12674-11-2	0.09	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013
Aroclor 1221	11104-28-2	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1232	11141-16-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1242	53469-21-9	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1248	12672-29-6	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1254	11097-69-1	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1260	11096-82-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1262	37324-23-5	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
Aroclor 1268	11100-14-4	0.09	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015	0.015	U	0.071	0.015
PCBs, Total	1336-36-3	~	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013	0.013	U	0.071	0.013

Notes:
Gray highlight designates that the compound detection limit was reported above the applicable criteria
Yellow highlight designated exceedance of the applicable criteria
J - Presumptive evidence of compound reported above the method detection limit but below the reporting limit.
U - Not detected

TABLE 3 (continued)
GROUNDWATER ANALYTICAL SUMMARY
METALS
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

	SAMPLE ID:	NYSDEC TOGS 1.1.1 GROUNDWATER QUALITY STANDARDS AND GUIDANCE VALUES	MW01				DUP(MW01)				MW01-I				MW01-D				MW02				MW02-I				MW02-D				MW03				MW04				MW05				MW06				FIELD BLANK				FIELD BLANK			
	LAB ID:		L2520811-02				L2520811-04				L2521121-01				L2521121-08				L2520811-01				L2521121-09				L2521121-11				L2521121-04				L2521121-05				L2521121-06				L2521121-07				L2520811-03				L2521121-10			
	COLLECTION DATE:		4/7/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/8/2025				4/8/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/7/2025				4/8/2025			
	SAMPLE DEPTH:																																																	
	SAMPLE MATRIX:		WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER				WATER			
DISSOLVED METALS																																																		
Aluminum, Dissolved	7429-90-5	~	3.27	U	10	3.27	3.38	J	10	3.27	3.97	J	10	3.27	4.13	J	10	3.27	5	J	10	3.27	4	J	10	3.27	4.75	J	10	3.27	3.8	J	10	3.27	3.27	U	10	3.27	3.27	U	10	3.27	3.27	U	10	3.27	4.5	J	10	3.27
Antimony, Dissolved	7440-36-0	3	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42
Arsenic, Dissolved	7440-38-2	25	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16
Barium, Dissolved	7440-39-3	1000	38.4		0.5	0.17	42.6		0.5	0.17	139.5		0.5	0.17	122.4		0.5	0.17	34.98		0.5	0.17	82.61		0.5	0.17	93.21		0.5	0.17	33.72		0.5	0.17	69.13		0.5	0.17	42.77		0.5	0.17	79.77		0.5	0.17	0.17	U	0.5	0.17
Beryllium, Dissolved	7440-41-7	3	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1
Cadmium, Dissolved	7440-43-9	5	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.07	J	0.2	0.05	0.05	U	0.2	0.05	0.06	J	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05
Calcium, Dissolved	7440-70-2	~	59200		100	39.4	64300		100	39.4	122000		100	39.4	109000		100	39.4	78900		100	39.4	78300		100	39.4	82900		100	39.4	48200		100	39.4	72400		100	39.4	112000		100	39.4	85800		100	39.4	39.4	U	100	39.4
Chromium, Dissolved	7440-47-3	50	0.2	J	1	0.17	0.2	J	1	0.17	0.17	U	1	0.17	0.17	U	1	0.17	0.23	J	1	0.17	0.17	U	1	0.17	0.17	U	1	0.17	104.4		1	0.17	10.45		1	0.17	0.18	J	1	0.17	0.26	J	1	0.17	0.17	U	1	0.17
Cobalt, Dissolved	7440-48-4	~	0.23	J	0.5	0.16	0.26	J	0.5	0.16	0.91		0.5	0.16	1.28		0.5	0.16	0.19	J	0.5	0.16	0.65		0.5	0.16	1.61		0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	3.21		0.5	0.16	1.2		0.5	0.16	0.16	U	0.5	0.16
Copper, Dissolved	7440-50-8	200	0.38	U	1	0.38	0.45	J	1	0.38	0.49	J	1	0.38	0.46	J	1	0.38	0.62	J	1	0.38	0.39	J	1	0.38	0.43	J	1	0.38	0.38	U	1	0.38	0.4	J	1	0.38	0.38	U	1	0.38	0.65	J	1	0.38	0.38	U	1	0.38
Iron, Dissolved	7439-89-6	300	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	19.1	U	50	19.1	1140		50	19.1	79.9		50	19.1	19.1	U	50	19.1
Lead, Dissolved	7439-92-1	25	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34
Magnesium, Dissolved	7439-95-4	35000	7820		70	24.2	7590		70	24.2	13400		70	24.2	20500		70	24.2	8260		70	24.2	13200		70	24.2	21100		70	24.2	5390		70	24.2	7630		70	24.2	8750		70	24.2	5700		70	24.2	24.2	U	70	24.2
Manganese, Dissolved	7439-96-5	300	799.3		2	0.44	871.4		2	0.44	276.5		1	0.44	598.4		1	0.44	713.4		2	0.44	314.4		1	0.44	792.8		1	0.44	1.86		1	0.44	0.67	J	1	0.44	1581		1	0.44	233.4		1	0.44	0.44	U	2	0.44
Mercury, Dissolved	7439-97-6	0.7	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09
Nickel, Dissolved	7440-02-0	100	0.55	U	2	0.55	0.55	U	2	0.55	2.86	J	2	0.55	4.43	J	2	0.55	0.55	U	2	0.55	1.65	J	2	0.55	3.68	J	2	0.55	0.55	U	2	0.55	0.55	U	2	0.55	1.66	J	2	0.55	0.86	J	2	0.55	0.55	U	2	0.55
Potassium, Dissolved	7440-09-7	~	4180		100	30.9	4620		100	30.9	7890		100	30.9	4540		100	30.9	4620		100	30.9	5190		100	30.9	3930		100	30.9	4390		100	30.9	6040		100	30.9	6420		100	30.9	6160		100	30.9	30.9	U	100	30.9
Selenium, Dissolved	7782-49-2	10	3.54	J	5	1.73	4.21	J	5	1.73	2.2	J	5	1.73	1.73	U	5	1.73	2.68	J	5	1.73	1.73	U	5	1.73	1.73	U	5	1.73	1.73	U	5	1.73	2.56	J	5	1.73	2.99	J	5	1.73	1.73	U	5	1.73	1.73	U	5	1.73
Silver, Dissolved	7440-22-4	50	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16
Sodium, Dissolved	7440-23-5	20000	19100		500	29.3	19500		500	29.3	95500		500	29.3	92000		500	29.3	29400		500	29.3	115000		500	29.3	143000		500	29.3	39100		500	29.3	73400		500	29.3	67700		500	29.3	26700		500	29.3	29.3	U	500	29.3
Thallium, Dissolved	7440-28-0	0.5	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14
Vanadium, Dissolved	7440-62-2	~	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57
Zinc, Dissolved	7440-66-6	2000	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	3.41	U	10	3.41	216.1		10	3.41	5.38	J	10	3.41	3.41	U	10	3.41
TOTAL METALS																																																		
Aluminum, Total	7429-90-5	~	162		10	3.27	42.9		10	3.27	159		10	3.27	159		10	3.27	38.8		10	3.27	171		10	3.27	72.9		10	3.27	78.8		10	3.27	26.8		10	3.27	6.07	J	10	3.27	10.6		10	3.27	5.66	J	10	3.27
Antimony, Total	7440-36-0	3	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42	0.42	U	4	0.42
Arsenic, Total	7440-38-2	25	0.21	J	0.5	0.16	0.17	J	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.35	J	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	0.24	J	0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16
Barium, Total	7440-39-3	1000	41.11		0.5	0.17	40.38		0.5	0.17	134.3		0.5	0.17	116.4		0.5	0.17	35.07		0.5	0.17	84.64		0.5	0.17	91.24		0.5	0.17	32.45		0.5	0.17	64.9		0.5	0.17	42.96		0.5	0.17	77.16		0.5	0.17	0.17	U	0.5	0.17
Beryllium, Total	7440-41-7	3	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1	0.1	U	0.5	0.1
Cadmium, Total	7440-43-9	5	0.06	J	0.2	0.05	0.06	J	0.2	0.05	0.07	J	0.2	0.05	0.05	U	0.2	0.05	0.06	J	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05	0.05	U	0.2	0.05
Calcium, Total	7440-70-2	~	62600		100	39.4	62800		100	39.4	105000		100	39.4	94700		100	39.4	79200		100	39.4	68300		100	39.4	70000		100	39.4	41600		100	39.4	60400		100	39.4	96100		100	39.4	75000		100	39.4	39.4	U	100	39.4
Chromium, Total	7440-47-3	50	0.94	J	1	0.17	0.45	J	1	0.17	1.19		1	0.17	1.81		1	0.17	0.48	J	1	0.17	0.91	J	1	0.17	1.49		1	0.17	98.94		1	0.17	8.87		1	0.17	0.37	J	1	0.17	1.18		1	0.17	0.17	U	1	0.17
Cobalt, Total	7440-48-4	~	0.4	J	0.5	0.16	0.31	J	0.5	0.16	1.06		0.5	0.16	1.39		0.5	0.16	0.23	J	0.5	0.16	0.77		0.5	0.16	1.5		0.5	0.16	0.16	U	0.5	0.16	0.16	U	0.5	0.16	2.89		0.5	0.16	1.11		0.5	0.16	0.16	U	0.5	0.16
Copper, Total	7440-50-8	200	0.8	J	1	0.38	0.51	J	1	0.38	0.96	J	1	0.38	1	J	1	0.38	0.66	J	1	0.38	0.91	J	1	0.38	0.82	J	1	0.38	0.65	J	1	0.38	0.38	U	1	0.38	2.18		1	0.38	0.61	J	1	0.38	0.38	U	1	0.38
Iron, Total	7439-89-6	300	222		50	19.1	55.2		50	19.1	439		50	19.1	539		50	19.1	110		50	19.1	433		50	19.1	306		50	19.1	168		50	19.1	41	J	50	19.1	3840		50	19.1	543		50	19.1	19.1	U	50	19.1
Lead, Total	7439-92-1	25	0.75	J	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.39	J	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34	0.34	U	1	0.34
Magnesium, Total	7439-95-4	35000	9510		70	24.2	8800		70	24.2	11900		70	24.2	19100		70	24.2	9290		70	24.2	12200		70	24.2	19200		70	24.2	5020		70	24.2	6660		70	24.2	7780		70	24.2	5460		70	24.2	24.2	U	70	24.2
Manganese, Total	7439-96-5	300	909.3		1	0.44	939.2		1	0.44	322.5		1	0.44	610.7		1	0.44	812.9		1	0.44	316.8		1	0.44	739.4		1	0.44	5.56		1	0.44	4.25		1	0.44	1768		1	0.44	217.2		1	0.44	0.44	U	1	0.44
Mercury, Total	7439-97-6	0.7	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09	0.09	U	0.2	0.09
Nickel, Total	7440-02-0	100	0.85	J	2	0.55	0.69	J	2	0.55	3.14		2	0.55	4.58		2	0.55	0.55	U	2	0.55	1.93	J	2	0.55	3.26		2	0.55	0.55	U	2	0.55	0.55	U	2	0.55	1.38	J	2	0.55	0.63	J	2	0.55	0.55	U	2	0.55
Potassium, Total	7440-09-7	~	4660		100	30.9	4630		100	30.9	7050		100	30.9	4210		100	30.9	4800		100	30.9	4660		100	30.9	3470		100	30.9	3960		100	30.9	5240		100	30.9	6020		100	30.9	5640		100	30.9	30.9	U	100	30.9
Selenium, Total	7782-49-2	10	3.39	J	5	1.73	4.08	J	5	1.73	2.53	J	5	1.73	1.73	U	5	1.73	3.11	J	5	1.73	1.87	J	5	1.73	1.73	U	5	1.73	2.11	J	5	1.73	2.56	J	5	1.73	2.56	J	5	1.73	1.73	U	5	1.73	1.73	U	5	1.73
Silver, Total	7440-22-4	50	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16	0.16	U	0.4	0.16
Sodium, Total	7440-23-5	20000	21100		500	29.3	20300		500	29.3	91100		500	29.3	94100		500	29.3	31100		500	29.3	115000		500	29.3	143000		500	29.3	38700		500	29.3	71100		500	29.3	78900		500	29.3	26600		500	29.3	29.3	U	500	29.3
Thallium, Total	7440-28-0	0.5	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14	0.14	U	1	0.14
Vanadium, Total	7440-62-2	~	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57	1.57	U	5	1.57
Zinc, Total	7440-66-6	2000	16.96		10	3.41	14.89		10	3.41	11.27		10	3.41	11.68		10	3.41	14.24		10	3.41	11.92		10	3.41	13.25		10	3.41	14.26		10	3.41	13.32		10	3.41	220.5		10	3.41	15.96		10	3.41	16.08		10	3.41	9.05	J	10	3.41

Notes:
Gray highlight designates that the compound detection limit was reported above the applicable criteria
Yellow highlight designated exceedance of the applicable criteria
J - Presumptive evidence of compound reported above the method detection limit but below the reporting limit.
U - Not detected

TABLE 4
AMBIENT AIR ANALYTICAL DATA SUMMARY
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
MARCH 2025

	SAMPLE ID:		SC-IAQ01				SC-IAQ02				SC-IAQ03				DUP				SC-IAQ04				SC-OAQ01			
	LAB ID:		L2518580-01				L2518580-02				L2518580-03				L2518580-10				L2518580-04				L2518580-09			
	COLLECTION DATE:	NYSDOH AIR GUIDANCE VALUES	3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025			
	SAMPLE DEPTH:																									
	SAMPLE MATRIX:		AIR				AIR				AIR				AIR				AIR				AIR			
ANALYTE	**CAS**		**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
VOLATILE ORGANICS IN AIR																										
1,1,1-Trichloroethane	71-55-6	~	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
1,1,2,2-Tetrachloroethane	79-34-5	~	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357
1,1,2-Trichloroethane	79-00-5	~	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318
1,1-Dichloroethane	75-34-3	~	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23
1,1-Dichloroethene	75-35-4	~	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
1,2,4-Trichlorobenzene	120-82-1	~	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742
1,2,4-Trimethylbenzene	95-63-6	~	1.35		0.983	0.284	1.29		0.983	0.284	0.678	J	0.983	0.284	0.693	J	0.983	0.284	0.408	J	0.983	0.284	0.511	J	0.983	0.284
1,2-Dibromoethane	106-93-4	~	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418
1,2-Dichlorobenzene	95-50-1	~	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372
1,2-Dichloroethane	107-06-2	~	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319
1,2-Dichloropropane	78-87-5	~	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292
1,3,5-Trimethylbenzene	108-67-8	~	0.374	J	0.983	0.295	0.364	J	0.983	0.295	ND		0.983	0.295	ND		0.983	0.295	ND		0.983	0.295	ND		0.983	0.295
1,3-Butadiene	106-99-0	~	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137
1,3-Dichlorobenzene	541-73-1	~	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467
1,4-Dichlorobenzene	106-46-7	~	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497
1,4-Dioxane	123-91-1	~	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194
2,2,4-Trimethylpentane	540-84-1	~	0.873	J	0.934	0.323	0.654	J	0.934	0.323	0.341	J	0.934	0.323	0.406	J	0.934	0.323	ND		0.934	0.323	0.677	J	0.934	0.323
2-Butanone	78-93-3	~	1.41	J	1.47	0.292	1.33	J	1.47	0.292	0.776	J	1.47	0.292	0.841	J	1.47	0.292	0.714	J	1.47	0.292	3.1		1.47	0.292
2-Hexanone	591-78-6	~	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374
3-Chloropropene	107-05-1	~	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269
4-Ethyltoluene	622-96-8	~	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272
4-Methyl-2-pentanone	108-10-1	~	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779
Acetone	67-64-1	~	27.1		2.38	1.22	20.4		2.38	1.22	7.46		2.38	1.22	7.46		2.38	1.22	6.87		2.38	1.22	22.5		2.38	1.22
Benzene	71-43-2	~	0.7		0.639	0.205	0.645		0.639	0.205	0.476	J	0.639	0.205	0.511	J	0.639	0.205	0.476	J	0.639	0.205	0.872		0.639	0.205
Benzyl chloride	100-44-7	~	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486
Bromodichloromethane	75-27-4	~	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462
Bromoform	75-25-2	~	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616
Bromomethane	74-83-9	~	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212
Carbon disulfide	75-15-0	~	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145
Carbon tetrachloride	56-23-5	~	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
Chlorobenzene	108-90-7	~	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238
Chloroethane	75-00-3	~	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171
Chloroform	67-66-3	~	0.669	J	0.977	0.27	0.615	J	0.977	0.27	ND		0.977	0.27	ND		0.977	0.27	0.772	J	0.977	0.27	ND		0.977	0.27
Chloromethane	74-87-3	~	1.1		0.413	0.119	1.07		0.413	0.119	1.11		0.413	0.119	1.01		0.413	0.119	0.981		0.413	0.119	1.12		0.413	0.119
cis-1,2-Dichloroethene	156-59-2	~	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
cis-1,3-Dichloropropene	10061-01-5	~	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306
Cyclohexane	110-82-7	~	0.31	J	0.688	0.251	ND		0.688	0.251	ND		0.688	0.251	0.368	J	0.688	0.251	ND		0.688	0.251	0.286	J	0.688	0.251
Dibromochloromethane	124-48-1	~	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482
Dichlorodifluoromethane	75-71-8	~	2.18		0.989	0.374	2.29		0.989	0.374	2.26		0.989	0.374	2.25		0.989	0.374	2.18		0.989	0.374	2.23		0.989	0.374
Ethanol	64-17-5	~	108		9.42	3.28	62		9.42	3.28	13.8		9.42	3.28	19.6		9.42	3.28	11.6		9.42	3.28	10.9		9.42	3.28
Ethyl Acetate	141-78-6	~	3.86		1.8	1.07	2.34		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07
Ethylbenzene	100-41-4	~	0.56	J	0.869	0.25	0.578	J	0.869	0.25	ND		0.869	0.25	ND		0.869	0.25	ND		0.869	0.25	0.334	J	0.869	0.25
Freon-113	76-13-1	~	0.621	J	1.53	0.388	0.659	J	1.53	0.388	0.621	J	1.53	0.388	0.575	J	1.53	0.388	0.575	J	1.53	0.388	0.514	J	1.53	0.388
Freon-114	76-14-2	~	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352
Heptane	142-82-5	~	1.97		0.82	0.339	1.84		0.82	0.339	0.5	J	0.82	0.339	0.631	J	0.82	0.339	0.93		0.82	0.339	0.57	J	0.82	0.339
Hexachlorobutadiene	87-68-3	~	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647
Isopropanol	67-63-0	~	17.3		2.46	0.669	6.64		2.46	0.669	8.04		2.46	0.669	2.8		2.46	0.669	8.43		2.46	0.669	6.61		2.46	0.669
Methyl tert butyl ether	1634-04-4	~	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162
Methylene chloride	75-09-2	60	0.677	J	1.74	0.434	0.681	J	1.74	0.434	0.677	J	1.74	0.434	0.636	J	1.74	0.434	0.73	J	1.74	0.434	0.691	J	1.74	0.434
n-Hexane	110-54-3	~	2.27		0.705	0.262	0.765		0.705	0.262	1.71		0.705	0.262	0.62	J	0.705	0.262	2.03		0.705	0.262	1.44		0.705	0.262
Naphthalene	91-20-3	~	ND		0.996	0.309	ND		0.996	0.309	0.346	J	0.996	0.309	0.582	J	0.996	0.309	ND		0.996	0.309	ND		0.996	0.309
o-Xylene	95-47-6	~	0.912		0.869	0.27	0.895		0.869	0.27	1.26		0.869	0.27	0.669	J	0.869	0.27	0.334	J	0.869	0.27	6.34		0.869	0.27
p/m-Xylene	179601-23-1	~	2.29		1.74	0.543	2.27		1.74	0.543	0.99	J	1.74	0.543	0.856	J	1.74	0.543	0.712	J	1.74	0.543	1.28	J	1.74	0.543
Styrene	100-42-5	~	0.353	J	0.852	0.254	0.336	J	0.852	0.254	0.656	J	0.852	0.254	0.307	J	0.852	0.254	ND		0.852	0.254	ND		0.852	0.254
Tertiary butyl Alcohol	75-65-0	~	ND		1.52	0.4	ND		1.52	0.4	ND		1.52	0.4	0.464	J	1.52	0.4	ND		1.52	0.4	0.731	J	1.52	0.4
Tetrachloroethene	127-18-4	30	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
Tetrahydrofuran	109-99-9	~	0.596	J	1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345
Toluene	108-88-3	~	7.99		0.754	0.327	10.6		0.754	0.327	1.64		0.754	0.327	1.6		0.754	0.327	0.991		0.754	0.327	1.47		0.754	0.327
trans-1,2-Dichloroethene	156-60-5	~	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299
trans-1,3-Dichloropropene	10061-02-6	~	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355
Trichloroethene	79-01-6	2	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
Trichlorofluoromethane	75-69-4	~	1.28		1.12	0.442	1.28		1.12	0.442	1.25		1.12	0.442	1.3		1.12	0.442	1.28		1.12	0.442	1.3		1.12	0.442
Vinyl bromide	593-60-2	~	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316
Vinyl chloride	75-01-4	~	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-
VOLATILE ORGANICS IN AIR BY SIM																										
1,1,1-Trichloroethane	71-55-6	~	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032
1,1-Dichloroethene	75-35-4	~	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031
Carbon tetrachloride	56-23-5	~	0.478		0.126	0.069	0.459		0.126	0.069	0.415		0.126	0.069	0.428		0.126	0.069	0.434		0.126	0.069	0.428		0.126	0.069
cis-1,2-Dichloroethene	156-59-2	~	0.091		0.079	0.04	0.099		0.079	0.04	ND		0.079	0.04	ND		0.079	0.04	0.297		0.079	0.04	ND		0.079	0.04
Tetrachloroethene	127-18-4	30	1.1		0.136	0.05	1.27		0.136	0.05	0.359		0.136	0.05	0.292		0.136	0.05	0.332		0.136	0.05	0.461		0.136	0.05
Trichloroethene	79-01-6	2	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032
Vinyl chloride	75-01-4	~	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023

NOTES:
Yellow highlight indicates exceedance of applicable criteria
J - Presumptive evidence of compound reported above the method detection limit but below the reporting limit.
ND -Not detected

TABLE 5
VAPOR ANALYTICAL DATA SUMMARY
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415
MARCH 2025

	SAMPLE ID:		SC-SSV01				SC-SSV02				SC-SSV03				SC-SSV04			
	LAB ID:		L2518580-05				L2518580-06				L2518580-07				L2518580-08			
	COLLECTION DATE:		3/26/2025				3/26/2025				3/26/2025				3/26/2025			
	SAMPLE DEPTH:	NYSDOH MATRICES																
	SAMPLE MATRIX:	THRESHOLDS	SOIL_VAPOR				SOIL_VAPOR				SOIL_VAPOR				SOIL_VAPOR			
ANALYTE	**CAS**		**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**	**Conc**	**Q**	**RL**	**MDL**
VOLATILE ORGANICS IN AIR																		
1,1,1-Trichloroethane	71-55-6	100	3.43		3.41	1.05	ND		2.73	0.84	ND		4.96	1.52	ND		4.54	1.4
1,1,2,2-Tetrachloroethane	79-34-5	~	ND		4.29	1.11	ND		3.43	0.893	ND		6.24	1.62	ND		5.72	1.49
1,1,2-Trichloroethane	79-00-5	~	ND		3.41	0.993	ND		2.73	0.797	ND		4.96	1.44	ND		4.54	1.32
1,1-Dichloroethane	75-34-3	~	ND		2.53	0.72	ND		2.02	0.575	ND		3.68	1.04	ND		3.37	0.959
1,1-Dichloroethene	75-35-4	6	ND		2.48	0.706	ND		1.98	0.563	ND		3.6	1.02	ND		3.3	0.94
1,2,4-Trichlorobenzene	120-82-1	~	ND		4.64	2.32	ND		3.71	1.86	ND		6.75	3.37	ND		6.18	3.1
1,2,4-Trimethylbenzene	95-63-6	60	1.08	J	3.07	0.885	1.11	J	2.46	0.708	ND		4.47	1.29	ND		4.1	1.18
1,2-Dibromoethane	106-93-4	~	ND		4.8	1.31	ND		3.84	1.05	ND		6.99	1.9	ND		6.4	1.74
1,2-Dichlorobenzene	95-50-1	~	ND		3.76	1.16	ND		3.01	0.932	ND		5.47	1.69	ND		5.01	1.55
1,2-Dichloroethane	107-06-2	~	ND		2.53	0.996	ND		2.02	0.797	ND		3.68	1.45	ND		3.37	1.33
1,2-Dichloropropane	78-87-5	~	ND		2.89	0.91	ND		2.31	0.73	ND		4.2	1.33	ND		3.85	1.22
1,3,5-Trimethylbenzene	108-67-8	60	ND		3.07	0.924	ND		2.46	0.737	ND		4.47	1.34	ND		4.1	1.23
1,3-Butadiene	106-99-0	~	ND		1.38	0.427	ND		1.11	0.343	ND		2.01	0.622	ND		1.84	0.571
1,3-Dichlorobenzene	541-73-1	~	ND		3.76	1.46	ND		3.01	1.17	ND		5.47	2.12	ND		5.01	1.95
1,4-Dichlorobenzene	106-46-7	~	ND		3.76	1.55	ND		3.01	1.24	ND		5.47	2.25	ND		5.01	2.07
1,4-Dioxane	123-91-1	~	ND		2.25	0.605	ND		1.8	0.483	ND		3.28	0.879	ND		3	0.807
2,2,4-Trimethylpentane	540-84-1	60	ND		2.92	1.01	ND		2.34	0.808	ND		4.25	1.47	ND		3.89	1.35
2-Butanone	78-93-3	~	ND		4.6	0.911	0.737	J	3.69	0.731	1.35	J	6.69	1.33	ND		6.13	1.22
2-Hexanone	591-78-6	~	ND		2.56	1.17	ND		2.05	0.934	ND		3.73	1.7	ND		3.41	1.56
3-Chloropropene	107-05-1	~	ND		1.96	0.842	ND		1.57	0.673	ND		2.85	1.22	ND		2.61	1.12
4-Ethyltoluene	622-96-8	~	ND		3.07	0.85	ND		2.46	0.678	ND		4.47	1.24	ND		4.1	1.14
4-Methyl-2-pentanone	108-10-1	~	ND		6.39	2.43	ND		5.12	1.95	ND		9.3	3.54	ND		8.52	3.25
Acetone	67-64-1	~	ND	J	7.41	3.82	12		5.94	3.06	22.1		10.8	5.56	ND	J	9.91	5.11
Benzene	71-43-2	60	ND		2	0.642	ND		1.6	0.514	ND		2.9	0.933	ND		2.66	0.856
Benzyl chloride	100-44-7	~	ND		3.24	1.52	ND		2.59	1.22	ND		4.71	2.21	ND		4.31	2.02
Bromodichloromethane	75-27-4	~	ND		4.19	1.44	ND		3.35	1.15	ND		6.09	2.1	ND		5.58	1.92
Bromoform	75-25-2	~	ND		6.46	1.92	ND		5.17	1.54	ND		9.4	2.8	ND		8.61	2.56
Bromomethane	74-83-9	~	ND		2.43	0.664	ND		1.94	0.532	ND		3.53	0.967	ND		3.23	0.885
Carbon disulfide	75-15-0	~	ND		1.95	0.452	ND		1.56	0.361	ND		2.83	0.657	ND		2.59	0.604
Carbon tetrachloride	56-23-5	6	ND		3.93	1.35	ND		3.15	1.08	ND		5.72	1.96	ND		5.24	1.8
Chlorobenzene	108-90-7	~	ND		2.88	0.741	ND		2.3	0.594	ND		4.19	1.08	ND		3.84	0.99
Chloroethane	75-00-3	~	ND		1.65	0.536	ND		1.32	0.427	ND		2.4	0.778	ND		2.2	0.712
Chloroform	67-66-3	~	9.33		3.05	0.84	4.87		2.44	0.674	154		4.44	1.23	91.8		4.07	1.12
Chloromethane	74-87-3	~	ND		1.29	0.372	0.686	J	1.03	0.297	ND		1.88	0.541	ND		1.72	0.496
cis-1,2-Dichloroethene	156-59-2	6	ND		2.48	0.737	0.999	J	1.98	0.591	ND		3.6	1.07	ND		3.3	0.983
cis-1,3-Dichloropropene	10061-01-5	~	ND		2.84	0.958	ND		2.27	0.763	ND		4.13	1.39	ND		3.78	1.28
Cyclohexane	110-82-7	60	ND		2.15	0.785	ND		1.72	0.626	ND		3.13	1.14	1.35	J	2.87	1.04
Dibromochloromethane	124-48-1	~	ND		5.32	1.51	ND		4.26	1.21	ND		7.74	2.19	ND		7.1	2.01
Dichlorodifluoromethane	75-71-8	~	2.49	J	3.09	1.17	2.3	J	2.47	0.935	2.02	J	4.49	1.7	2.26	J	4.12	1.56
Ethanol	64-17-5	~	ND		29.4	10.3	31.8		23.6	8.2	ND		42.8	14.9	ND		39.2	13.7
Ethyl Acetate	141-78-6	~	ND		5.62	3.34	ND		4.5	2.67	ND		8.18	4.86	ND		7.5	4.47
Ethylbenzene	100-41-4	60	ND		2.71	0.782	ND		2.17	0.625	ND		3.95	1.13	ND		3.62	1.04
Freon-113	76-13-1	~	ND		4.79	1.21	ND		3.83	0.966	ND		6.97	1.76	ND		6.38	1.62
Freon-114	76-14-2	~	ND		4.37	1.1	ND		3.49	0.881	ND		6.35	1.6	ND		5.82	1.47
Heptane	142-82-5	200	ND		2.56	1.06	ND		2.05	0.848	ND		3.73	1.54	16.7		3.41	1.41
Hexachlorobutadiene	87-68-3	~	ND		6.67	2.03	ND		5.33	1.62	ND		9.7	2.94	ND		8.89	2.7
Isopropanol	67-63-0	~	19.5		7.67	2.09	42		6.15	1.67	6.02	J	11.2	3.05	ND		10.3	2.78
Methyl tert butyl ether	1634-04-4	~	ND		2.25	0.508	ND		1.8	0.404	ND		3.28	0.735	ND		3	0.678
Methylene chloride	75-09-2	100	ND		5.42	1.36	ND		4.34	1.08	ND		7.89	1.97	ND		7.23	1.81
n-Hexane	110-54-3	200	ND		2.2	0.818	6.94		1.76	0.656	ND		3.2	1.19	39.8		2.94	1.09
Naphthalene	91-20-3	60	ND		3.11	0.965	ND		2.49	0.776	ND		4.53	1.41	ND		4.15	1.29
o-Xylene	95-47-6	60	1.48	J	2.71	0.843	1.02	J	2.17	0.673	ND		3.95	1.22	1.34	J	3.62	1.12
p/m-Xylene	179601-23-1	200	ND		5.43	1.7	1.51	J	4.34	1.36	ND		7.91	2.47	ND		7.25	2.26
Styrene	100-42-5	~	ND		2.66	0.792	ND		2.13	0.634	ND		3.87	1.15	ND		3.55	1.06
Tertiary butyl Alcohol	75-65-0	~	ND		4.73	1.25	ND		3.79	1	ND		6.88	1.82	ND		6.31	1.67
Tetrachloroethene	127-18-4	100	1160		4.24	1.33	895		3.39	1.06	1630		6.16	1.93	1640		5.65	1.77
Tetrahydrofuran	109-99-9	~	ND		4.6	1.08	ND		3.69	0.861	ND		6.69	1.57	ND		6.13	1.44
Toluene	108-88-3	300	1.68	J	2.36	1.02	3.39		1.88	0.818	ND		3.43	1.48	1.44	J	3.14	1.36
trans-1,2-Dichloroethene	156-60-5	~	ND		2.48	0.936	ND		1.98	0.749	ND		3.6	1.36	ND		3.3	1.25
trans-1,3-Dichloropropene	10061-02-6	~	ND		2.84	1.11	ND		2.27	0.89	ND		4.13	1.62	ND		3.78	1.48
Trichloroethene	79-01-6	6	11.5		3.36	0.919	83.8		2.69	0.736	10		4.89	1.34	74.7		4.48	1.23
Trichlorofluoromethane	75-69-4	~	1.4	J	3.51	1.38	1.36	J	2.81	1.11	ND		5.11	2.01	ND		4.68	1.84
Vinyl bromide	593-60-2	~	ND		2.73	0.988	ND		2.19	0.787	ND		3.97	1.43	ND		3.64	1.32
Vinyl chloride	75-01-4	6	ND		1.6	0.465	ND		1.28	0.373	ND		2.32	0.675	ND		2.13	0.619

NOTES:
Yellow highlight indicates exceedance of applicable criteria
J - Presumptive evidence of compound reported above the method detection limit but below the reporting limit.
ND -Not detected

APPENDIX A
QUALITY ASSURANCE PROJECT PLAN

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QUALITY ASSURANCE PROJECT PLAN
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
JANUARY 2025 (REVISION 2 - MARCH 2025)
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2403

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C- Pace Analytical Services ENV-SOP-MANS-0111 v01 Preparation and Analysis of PFAS in Aqueous, Solid, and Tissue by EPA Method 1633

D – List of PFAS for analysis under EPA Method 1633

1.0 INTRODUCTION

Castleton Environmental Geologic Services, DPC (Castleton), has prepared this Quality Assurance Project Plan (QAPP) for the property located 655-671 Stanley Avenue Brooklyn, New York to support the SC activities for this site.

This QAPP provides a general overview of the measure to be employed during the investigation activities at the site.

2.0 PROJECT SCOPE

The objective of the site characterization (SC) includes assessing areas of concern including groundwater quality and the potential for a soil vapor intrusion (SVI) condition at the site.

The proposed scope of work for the SC includes:

- A geophysical survey to determine sewer and drainage pathways and to clear locations of underground obstructions prior to intrusive activities commencing;
- Installation of additional groundwater monitoring wells to assess vertical groundwater quality;
- Groundwater sampling to assess post remedial effects on groundwater quality;
- A soil vapor intrusion (SVI) investigation to assess appropriate vapor mitigation measures.

Castleton will conduct the SC on behalf of the site owner Unidos ZR LLC. All SC work will be overseen by a Qualified Environmental Professional (QEP) and/or a NYS Professional Geologist (PG).

The scope of this QAPP is to provide Quality Assurance/Quality Control (QA/QC) procedures during the proposed SC Work Plan. The intent of the SC Work Plan is to characterize the nature and extent of site contamination identified in previous investigations, including:

- Installation of monitoring wells.
- Groundwater sampling of existing and newly installed monitoring wells.
- Soil vapor intrusion sampling

The purpose and scope of this QAPP is to provide guidance and procedures intended to ensure data derived during the SC activities are of sufficient quality to be relied upon for its intended use. The goals of this QAPP include ensuring QA/QC measures are met and include:

- Accuracy
- Precision
- Sensitivity
- Representation
- Completeness
- Comparability (Where applicable)

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Site plans depicting the proposed sampling areas are provided as Figure 1.

3.0 PROJECT TEAM

The QAPP shall be implemented by several organizations and personnel under contract as listed below:

- Project Manager – Castleton – Jessica Ferngren, PG (Sr. Consultant)
- Quality Assurance Officer (QAO) – Castleton – Frank Castellano, PG (Principal)
- Field Staff – Castleton – John Zator (Staff Scientist)
- Data Validator – Richard Baldwin, CPG, PG (Senior Scientist)

Personnel resumes are included as Appendix A.

3.1 Environmental Laboratory Accreditation Program

An ELAP-certified laboratory will be used for all sample analyses. The laboratory will follow the following QA/QC protocols. All samples will be delivered to the laboratory within 24 hours of sample collection. Samples will be received by laboratory personnel, who will inspect the sample cooler(s) to check the integrity of the custody seals. The cooler(s) will then be opened, the samples unpackaged, and the information on the chain-of-custody form examined. If the shipped samples match those described on the chain-of-custody form, the laboratory sample custodian will sign and date the form on the next "Received" blank and assume responsibility for the samples. If problems are noted with the sample shipment, the laboratory custodian will sign the form and record problems in the "Remarks" box. The custodian will then immediately notify the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

A record of the information detailing the handling of a particular sample through each stage of analysis will be maintained by the laboratory. The record will include:

- Job reference, sample matrix, sample number, and date sampled;
- Date and time received by laboratory, holding conditions, and analytical parameters;
- Extraction date, time and extractor's initials (if applicable), analysis date, time, and analyst's initials; and
- QA batch number, date reviewed, and reviewer's initials.

The selected ELAP approved lab for this project is Pace Analytical Services.

4.0 DATA QUALITY USABILITY OBJECTIVES

The overall data quality objectives of this QAPP is to collect and derive data that is of reliable and documented quality for its intended purpose. Specific to the proposed SC, the specific objectives include collected representative air, vapor and groundwater samples of sufficient frequency and

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distribution to characterize. By implementing appropriate QA/QC procedures for the sample collection, laboratory analysis, and validation will help ensure the analytical results are accurate and of documented quality which can be relied upon for decision making for future investigation and remediation activities.

4.1 Standards, Criteria, and Guidance

The following standards, criteria, and guidance (SCGs) have been identified for the site:

- NYSDEC DER-10;
- The NYSDEC Class GA Ambient Water Quality Standards and Guidance Values, which are used to evaluate the groundwater chemical analytical results;
- NYSDEC's April 2023 Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), which are used to evaluate PFAS results from groundwater samples;
- New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)* and subsequent updates
- The 6 NYCRR Parts 370, 371, and 372 regulations for hazardous waste management, which are used to guide hazardous waste characterization and disposal

5.0 SAMPLING AND DECONTAMINATION PROCEDURES

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, daily;
- Use of dedicated and/or disposable field sampling equipment;
- Proper decontamination when non-disposable field equipment is utilized;
- Proper sample handling and preservation;
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- Disposable sampling equipment, including acetate sleeves, nitrile gloves, and disposable bailers (or sample tubing), will be used to minimize cross-contamination between samples;
- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary;

Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

QA/QC procedures will be used to provide performance information regarding field procedures to:

- document that samples are representative of actual conditions at the site and
- identify possible cross-contamination from field activities or sample transit.

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Specific laboratory QA/QC procedures and analyses will be used to:

- demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or
- by laboratory techniques that may have introduced systematic or random errors to the analytical process.

Groundwater sampling will be conducted in accordance with Appendix C- Sampling Protocols for PFAS in Monitoring Wells as per *NYSDEC Sampling, Analysis, and Assessment of Per and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs.*

5.1 Sampling Sequence

To reduce the risk of cross-contamination, soil and groundwater sampling will be conducted in the following sequence at all locations where multiple analyte groups will be tested:

- Following the advancement of soil sampling equipment to the target depth or the completion of purging for groundwater, all of the samples for PFAS testing will be obtained, containerized, labeled, and managed under chain of custody procedures and in accordance with laboratory recommendations before sampling for other analytes is conducted. QA/QC samples for PFAS analysis will also be collected at this time;
- Following the completion of PFAS sampling, and after those samples have been properly secured, the samples for 1,4-dioxane testing will be obtained. These samples will also be obtained, containerized, labeled and managed under chain of custody procedures and in accordance with laboratory recommendations prior to conducting sampling for other analytes. QA/QC samples for 1,4-dioxane analysis will also be collected at this time; and
- After all of the samples for PFAS and 1,4-dioxane analyses are secured, sampling for the other analytes will be conducted.

5.2 QA/QC Samples

QA/QC samples will be collected and utilized to evaluate the potential for field or laboratory contamination and to evaluate the laboratory's analytical precision and accuracy. The specific types of QA/QC samples to be collected are described below.

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples.
- The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20

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samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers

- Request appropriate data deliverable (Category B) and an electronic data deliverable

5.3 Sampling and Investigation Procedures

The SC is a multi-media investigation which includes sampling of air, vapor and groundwater. A variety of sampling techniques may be utilized including:

- Hollow Stem Auger/Direct Push Drilling
- Vapor Screening
- Soil Vapor Implant and Ambient Air Sampling
- Groundwater Monitoring Well Installation and Sampling

5.4 Decontamination Procedures

In general, all non-disposable downhole equipment used during sampling activities will be decontaminated by washing in a potable water and Alconox solution and rinsing in potable water prior to use at each location to reduce the potential for cross contamination. All sampling equipment will be either dedicated disposable equipment or will be decontaminated prior to use at each location. The decontamination procedures utilized for all non-disposable sampling equipment will be as follows:

- The equipment will be scrubbed in a bath of potable water and low-phosphate detergent (Alconox or Liquinox) followed by a potable water rinse;
- The equipment will be rinsed with distilled water; and
- The equipment will be allowed to air dry, if feasible.

In addition, for sampling activities involving PFAS, the following procedures will be followed due to the prevalence of these compounds in consumer products:

- No field clothing or PPE containing Gore-Tex, Tyvek, or fabric softener, will be worn. Any wet weather clothing will be made of polyurethane or PVC only;
- Waterproof field books, plastic clipboards, binders, or hard cover notebooks will not be used. No materials with adhesives (tape, post-it notes, etc.) will be used. Permanent markers (e.g. Sharpies) will not be used (ballpoint pens are acceptable);
- Field personnel will not use cosmetics, moisturizers, hand cream, sunscreen or insect repellent on the day of sampling. Field personnel must wash hands prior to donning nitrile gloves used during sampling;
- All decontamination will be performed using laboratory-provided PFAS-free water, Alconox, and/or Liquinox. Aluminum foil will not be used;

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- All field equipment must not contain Teflon or low-density polyethylene materials. All sampling materials must be made from stainless steel, HDPE, acetate, silicon, or polypropylene; and
- PFAS samples must be maintained in a separate cooler from other types of samples (some sample containers contain PFAS). Coolers containing PFAS samples may be cooled with regular ice only; blue ice packs may not be used.
- PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

5.5 Chain of Custody Procedures

After each sample is collected and appropriately identified, the following information will be recorded on the chain-of-custody form:

- sample identification;
- date and time of sample collection;
- sampling depth;
- identity of samplers;
- sampling methods and devices;
- soil vapor purge volumes;
- volume of soil vapor extracted;
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone; and
- chain of custody protocols and records used to track samples from sampling point to analysis.

The sampler will sign and date the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form in a Ziploc plastic bag. The canisters will be picked up by a laboratory representative from the site or hand delivered to the laboratory.

5.6 Field Logs and Reports

Field logs and borings logs will be completed throughout the course of this investigation. A field log will be completed daily which will describe all field activities including:

- Project number, name, manager, and address;
- The date and time;
- The weather conditions;
- On-site personnel and associated affiliations;
- Description of field activities; and
- Pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

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6.0 ANALYTICAL METHODS/QUALITY ASSURANCE

To assess the adequacy of the samples collected and decontamination procedures performed in the field, QA/QC samples shall be collected and analyzed throughout the field sampling program. In general, QA/QC samples shall confirm that the procedures performed in the field are consistent and acceptable. QA/QC samples must include trip blanks, field (or equipment) blanks, blind (or field) duplicates, matrix spike (MS), and matrix spike duplicate (MSD).

The anticipated sample matrices collected for the purpose of this QAPP include air, vapor and groundwater samples. The types and frequencies of field QA/QC samples are provided in the table below:

QA/QC Samples	Frequency
Field/Equipment Blanks	1 per day / matrix
Trip Blanks	1 per cooler
Analytical Parameters	In accordance with 6 NYCRR Part 375
Minimum reporting Limits	In accordance with 6 NYCRR Part 375
MS/MSD Samples to be Collected	1 each per 20 samples/matrix
Duplicate and Blind Duplicate Samples	1 each per 20 samples/matrix

The Analytical Methods/Quality Assurance Summary Table is included as Table 1. The Pace Analytical Services Standard Operating Procedure for the Preparation and Analysis of PFAS in Aqueous, Solid and Tissue by EPA Method 1633 is included in Appendix C.

The list of PFAS to be analyzed is included in Appendix D.

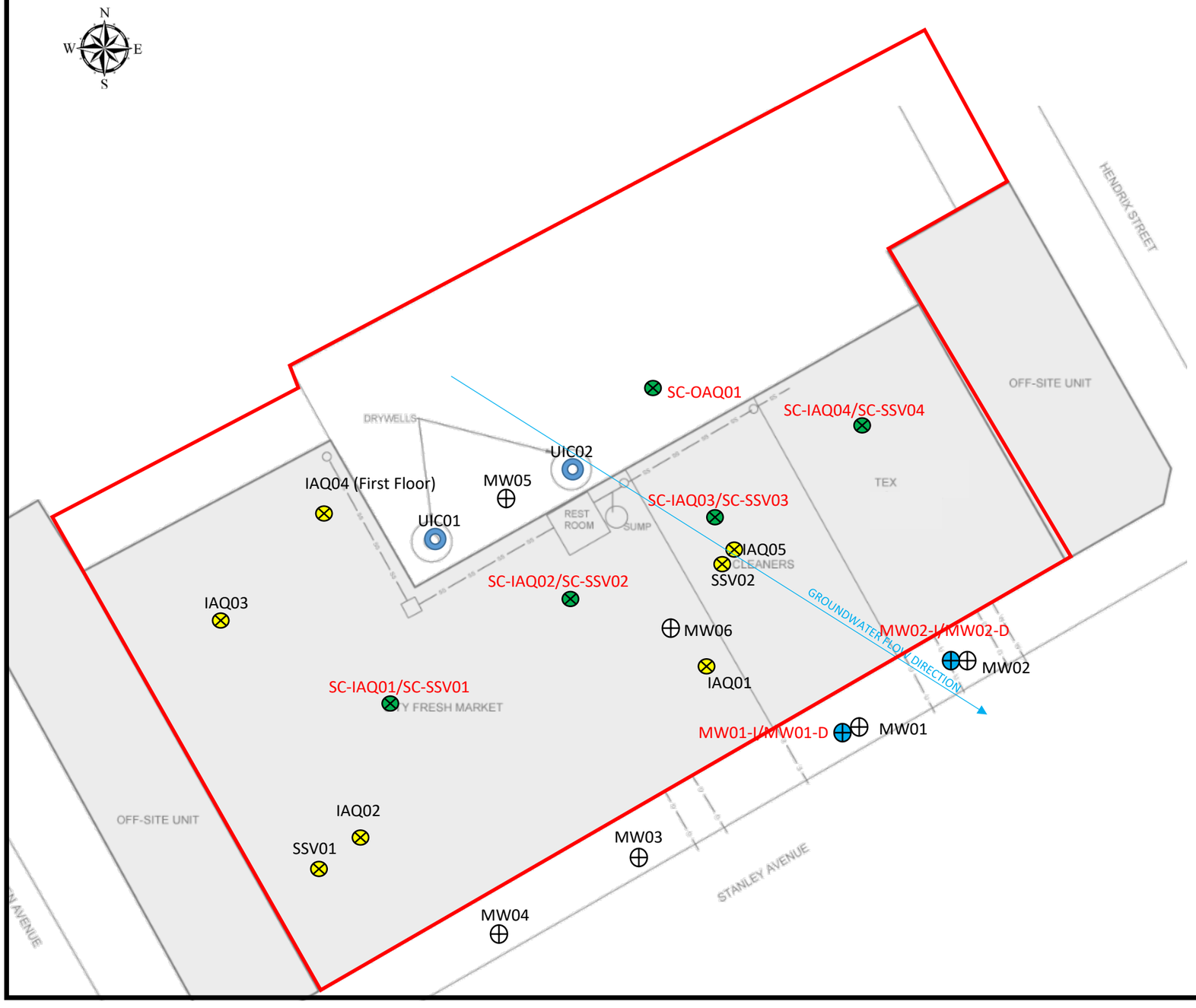
7.0 DATA USABILITY SUMMARY REPORT

A Category B Data Usability Summary Report (DUSR) will be prepared by a third-party contractor (Richard Baldwin). This will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A data usability summary report (DUSR) will be prepared for each data package following the “Guidance for the Development of Data Usability Summary Reports” provided by the NYSDEC (Appendix 2B of DER-10).

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FIGURES

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LEGEND

- Site Boundary
- Air/Vapor Sample Location (JAN 2024)
- Drywells
- Monitoring Well Location (JAN 2024)
- Proposed Monitoring Well Locations
- Proposed Indoor Air/Sub-slab Vapor/Outdoor Air Sample Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc. Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 1
PROPOSED SAMPLING LOCATIONS

655-671 STANLEY AVENUE
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TABLES

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TABLE 1
SITE CHARACTERIZATION SAMPLING MATRIX
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE # 224415

Matrix	Number of Sample Locations	Proposed Sample Locations	Number of Samples to be Collected/Analyzed	Field and Trip Blanks	Analyses	Minimum Reporting Requirements	Matrix Spike/Matrix Spike Duplicates	Duplicates	Sample Preservation	Sample Container Volume/Type	Sample Hold Time
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Target Compound List (TCL) VOCs by USEPA Method 8260	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	HCL, pH<2, 0-6°C	Amber Glass, Teflon Lined (3) 40 ml VOA Vials	14 Days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	TCL Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	Amber Glass, Teflon Lined (2) 1000 ml	7 Days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Target Analyte List (TAL) Metals by USEPA Methods 6010 and 7470/7471 (total)	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	HNO3, pH<2, 0-6°C	Plastic (1) 500 ml	28 days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Target Analyte List (TAL) Metals by USEPA Methods 6010 and 7470/7471 (dissolved);	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	Plastic (1) 500 ml	28 days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Polychlorinated Biphenyls by USEPA Method 8082	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	Amber Glass, Teflon Lined (2) 1000 ml	365 Days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	Pesticides by USEPA Method 8081	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	Na2S2O3, 0-6°C	Amber Glass, Teflon Lined (2) 1000 ml	7 Days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	NYSDEC target analyte list PFAS (April 2023) by USEPA Method 1633	2 ng/L (ppt) PFOA DL=0.263 ng/L, LOQ 1.6 ng/L PFOS DL=0.264 ng/L, LOQ 1.6 ng/L	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	(2) 500 mL linerless HDPE container	28 Days
Groundwater	10	Monitoring wells MW01, MW01-I, MW01-D, MW02, MW02-I, MW02-D, MW03, MW04, MW05, MW06	10-SAMPLES	1-Field Blank per day 1-Trip Blank per cooler	1,4-Dioxane by USEPA Method 8270 in selective ion monitoring (SIM) mode	In accordance with 6 NYCRR Part 375	1-MS/MSD per 20 samples	1-Duplicate per 20 samples	0-6°C	Amber Glass, Teflon Lined (2) 500 ml	7 Days
Air/ Vapor	9	Soil Vapor Intrusion (SVI) investigation. 4 sub-slab soil vapor samples (SC-SSV01 through SC-SSV04), 4 basement indoor air samples (SC-IAQ01 through SC-IAQ04); 1 outdoor air sample (SC-OAQ01)	9-SAMPLES	NOT APPLICABLE	VOCs (Method TO-15/TO-15 SIM)	In accordance with the NYSDOH Soil Vapor Intrusion Guidance and Updates (last updated February 2024)	NOT APPLICABLE	1-Duplicate per 20 samples	NOT APPLICABLE	6 liter SUMMA * with 8 hour regulators	7 Days

APPENDIX A – PERSONNEL RESUMES

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

CASTLETON ENVIRONMENTAL

Frank P. Castellano, PG

10/10/2024 | Principal and Founder



After 23 years leading one of the region's most accomplished and diverse environmental consulting firms, Mr. Castellano founded Castleton Environmental Geologic Services, D.P.C. in 2015 to focus on providing high value environmental consulting services specifically geared to the commercial lending and real estate investment/management industries. Leveraging his many years of experience, Mr. Castellano has earned a reputation for developing strategic approaches to the environmental challenges of complex real estate transactions, redevelopment projects and portfolio management. These approaches enable the transactions to proceed to closing while managing the risks of the involved stakeholders.

Contact Mr. Castellano at frankc@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental Babylon, NY	Founded 2015
PW Grosser Consulting, Inc., Bohemia, NY	1992 – 2015 - Last position held – Sr. Vice President/COO
H2M Group Melville, NY	1989-1992 - Last position held – Field Hydrogeologist

EDUCATION

Adelphi University
Master of Science – Hydrogeology, 1993

State University of New York at Oneonta
Bachelor of Science – Water Resources, 1989

CASTLETON ENVIRONMENTAL

CERTIFICATIONS/QUALIFICATIONS

NYS Professional Geologist, (License No. 000705)
Environmental Professional per 40 CFR 312.10(b)
Licensed Professional Geologist, PA
Licensed Real Estate Sales Professional, NY
OSHA Health & Safety HAZWOPER

AREAS OF EXERTISE

Real Property Transactions & Risk Management
Environmental Program Management
NYC/NYS Brownfields/E-Designations
Real Estate Portfolio Management
Hazardous Waste Investigation and Cleanup

AFFILIATIONS

Long Island Association of Professional Geologists, Member
Long Island Business Development Council, Board Member
Long Island Real Estate Group, Member

NOTABLE ASSIGNMENTS

GTJ REIT Portfolio Management

Mr. Castellano serves as the primary environmental consulting resource to a large Real Estate Investment Trust with holdings in suburban New York, New Jersey, Connecticut and Maryland. Working directly alongside the REIT management team, Mr. Castellano provides environmental due diligence guidance beginning at the contract negotiation phase through closing on new acquisitions. Providing Phase I and II Environmental Site Assessment support, Property Condition Assessments and evaluation of potential liabilities, Mr. Castellano works as part of the team to minimize risk while continuing to help the team add assets to their portfolio. Routine management of the portfolio requires Mr. Castellano's support during tenant lease negotiations, compliance activities and debt re-positioning.

Paramount Assets Portfolio Management

Mr. Castellano serves as a trusted environmental resource to the management team of this real estate company, comprised largely of urban commercial and retail buildings throughout New Jersey. Navigating New Jersey's complex environmental regulatory framework, Mr. Castellano assists this client with pre-acquisition due diligence as well as compliance with the Industrial Site Recovery Act (ISRA).

CASTLETON ENVIRONMENTAL

Phase II Environmental Assessments

For over 30 years, Mr. Castellano has been performing Phase II Environmental Site Assessments for a variety of private real estate clients and lending institutions. For these projects, Mr. Castellano utilizes his knowledge of various field sampling and testing techniques to meet the desired objective of characterizing potential environmental risks. Based on the Phase II findings, Mr. Castellano develops strategies to remedy identified problems and/or manage risks. The ultimate goal for every Phase II is to develop the appropriate strategy to advance the transaction while protecting the interests of those involved. Based on the quality of his work, Mr. Castellano has established many long-standing client relationships due to his ability to deliver clarity to real estate transactions mired in environmental turbidity.

PUBLICATIONS

Case Studies Using USCG Oil Identification System for Petroleum Spill Source Identification (Petroleum Hydrocarbons & Organic Chemicals in Ground Water, Conference, TX, 1993

Intrusive Investigative Techniques for the Identification of DNAPL (Geology of LI/NY; LIAPG 1996)

Surface Water, Sediment & Fishery Survey, Nassau County Ponds (Geology of LI/NY 1997)

Not Just a Chemical Interaction: Complementary Roles of the Geologist & Engineer on Hazardous Waste Remediation Project (Geology of LI/NY 1997)

MTBE in Ground Water Cleanup Technology and Costs (NYIT – Emerging Problems for the New Century 2002)

DOE Brookhaven National Laboratory Transuranic & Legacy Waste Disposal (Waste Management 05 Conference, Tucson, AZ)

Is Your Real Estate Giving You the Vapors? A Look at Soil Vapor Intrusion Regulations and their Impact on Real Estate Transactions (Society of Chief Appraisers NY Conference, Oct 2018)

Jessica Ferngren, P.G.

10/10/2024 | Senior Consultant



As Senior Consultant at Castleton, Jessica Ferngren leverages her more than 20 years of experience in the Environmental Consulting Industry to serve the needs of the firm's clients. Her areas of expertise include Phase I and Phase II Environmental Site Assessments, Remedial Investigations and Remedial Actions under NYSDEC Spills, Hazardous Waste, and Brownfield Programs and NYSDOH, Underground Injection Control Structure Characterization and Remediation under EPA, Nassau County and Suffolk County protocols. Ms. Ferngren has an excellent record in timely completion and maintenance of project coordination, monitoring, and document preparation, while successfully maintaining communication between clients, government agencies, and other parties involved.

Contact Ms. Ferngren at jessicaf@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental, Inc. Babylon, NY	Aug 2015 – Present – Sr. Project Manager
PW Grosser Consulting, Inc. Bohemia, NY	Mar 2014 – Jul 2015 – Sr. Project Manager
Athenica Environmental Services, Inc. Long Island City, NY	Dec 2013 - Mar 2014– Sr. Project Manager
Groundwater & Environmental Services, Inc. Hauppauge, NY	Mar 2012 – Dec 2013–Sr. Project Manager
Gannett Fleming Engineers, PC Locust Valley/Woodbury, NY	Aug 2005- Jun 2011- Project Manager
Shaw E&I, Inc. Holbrook, NY	Sep 2002-Jun 2005-Project Geologist
ERM, Woodbury/Melville, NY	Sep 2000-Sep 2002-Staff Geologist

CASTLETON
ENVIRONMENTAL

EDUCATION

State University of New York at Geneseo
Bachelor of Arts – Geological Sciences, 2000

CERTIFICATION/LICENSES

NYS Professional Geologist License No. 000982
OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-hr & Site Supervisor
RCRA Training
Loss Prevention Systems (LPS), First Aid and CPR
NYCOER Turbo Training

AREAS OF EXERTISE

Environmental Program Management
Hazardous Waste Investigation and Cleanup
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists (Co-President 2014-2015)
American Institute of Professional Geologists – NE Section
New York State Counsel of Professional Geologists

NOTABLE ASSIGNMENTS

Site Assessments and Investigations

Ms. Ferngren has served as a Senior Consultant responsible for hundreds of properties in support of land acquisition or transfer. Support includes Phase I Environmental Site Assessments, Work Plans, Phase II Site Assessment Reports, Investigation Summaries/Remedial Plans, and Remedial Cost Estimates. Responsibilities include cost proposal development, budget and technical tracking, the coordination of soil, groundwater, indoor air, soil vapor, and performing site characterizations. She serves as the liaison with the client, contractors, and state and local officials.

Portfolio Management of Retail Service Station Facilities

Ms. Ferngren has served as Senior Project Manager responsible for the management of over 40 former retail service stations. Her responsibilities in this role included coordination and management of field work including, underground storage tank and fuel system removals, groundwater plume and soil impact delineation, well installation, soil vapor extraction/air sparge system operations and maintenance, and feasibility testing and implementing in situ chemical oxidation. Ms. Ferngren has also led the development of Health and Safety Plans, Site Assessment Work Plans, Interim Remedial Measure and Remedial Action Work Plans and coordinated resulting remedial efforts. Responsible for tracking and maintaining project budgets and relations with the client and the regulators.

John Zator

10/10/2024

Field Manager



John Zator brings almost 8 years of environmental consulting experience to serve the needs of Castleton's clients. His areas of expertise include Phase II Environmental Site Assessments, Remedial Investigations, Remedial Systems Operations/Maintenance and field testing/sampling. Additionally, Mr. Zator has experience working with the local regulatory agencies, Suffolk County Department of Health Services, Nassau County Department of Health, as well as local town/hamlet/village municipalities. Mr. Zator received his Bachelor of Science degree from the State University of New York, at Potsdam in Geology.

The depth and unique experience of each of the Castleton team members complement one another in a way that provides our clients a level of service that exceeds the simple transaction and provides for a more strategic and partnered approach to move projects through to completion.

Contact Mr. Zator at jzator@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental — Jul 2022 – Present
Field Manager
Babylon, NY

Preferred Environmental Services — Jan 2017 - Jul 2022
Geologist I/Lead System Operator
North Merrick, NY

EDUCATION

State University of New York at Potsdam
Bachelor of Science – Geology, 2016

CERTIFICATION/LICENSES

OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-Hr
OSHA 10-Hr Construction Health & Safety
Confined Space Training
Fall Safety Training
NFPA 70E Electrical Training
First Aid and CPR

AREAS OF EXERTISE

Phase II Environmental Due Diligence
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists

NOTABLE ASSIGNMENTS

Lead Operator of Remediation System at State Superfund Site

Mr. Zator served as the Lead Operator of the Operable Unit 1 (OU1) Sub-Slab Depressurization System (SSDS) at the former Unisys Site in Lake Success, New York. Duties included system monitoring, maintenance, provide status updates to operations team and client (Lockheed Martin), performance/compliance testing and sampling, manage field activities/site operations for any on-site work. Responsibilities also included preparation of reports, system alarm testing, and oversight for sub-contractor work.

Site Assessments and Investigations

Mr. Zator has served as a Field Manager for numerous Phase II Environmental Site Assessments, Remedial Investigations, and Remediation projects.

RICHARD BALDWIN, CPG, PG

Senior Scientist

Richard Baldwin has over 30 years of environmental experience, with particular expertise in storm recovery and remedial actions, resiliency, flood-event evaluation, environmental investigations, waterway studies, building material surveys and indoor air quality (IAQ) investigations at industrial, private, federal and publicly-owned facilities. He is well versed in collecting and analyzing soil, soil vapor, groundwater, bottom sediment and water column samples. He has designed and implemented Remedial Investigations (RIs), remediation work plans, bathymetric surveys, geotechnical evaluations, regulatory permit evaluation/acquisition, contractor evaluation/oversight, and public awareness and education. Mr. Baldwin has extensive experience in evaluating complex laboratory data packages to ensure that they are precise, accurate, repeatable and comparable.



He earned a BA in geology from San Francisco State University and is a licensed Professional Geologist in New York and in Pennsylvania, and an American Institute of Professional Geologists Certified Professional Geologist. He is an Adjunct Professor in the Earth Sciences Department at State University of New York at Stony Brook.

CONTACT INFORMATION
Richard Baldwin, CPG, PG

Rbaldwin175@ gmail.com
+1 (631) 987-6710

EDUCATION

Graduate Course Work, San Jose State University, 1985-1988
BA, Geology, San Francisco State University, 1982

ENVIRONMENTAL DATA ANALYSES

Mr. Baldwin has received multiple sessions of environmental geochemistry training provided by environmental geochemists, including physical chemistry, thermodynamics, ionic interactions, complexation, biologic effects, and other basic principles. Training also included field sampling procedures and effects on chemical data chemical analytical methods and equipment, and Quality Assurance/Quality Control (QA/QC) procedures and interpretation.

Mr. Baldwin has reviewed and evaluated numerous soil, groundwater, product, indoor/ambient air and soil vapor chemical analytical datasets, including evaluation of batch and site-specific QA/QC samples, laboratory narratives, comparison to regulatory agency criteria, historic data, and background data.

Mr. Baldwin has been responsible for the development and implementation of numerous Quality Assurance Project Plans (QAPP), including QAPP design, sample delivery group (SDG) evaluations, sampling procedures and sequences, and QA/QC sample preparation/collection. Mr. Baldwin has attended periodic environmental chemistry training sessions hosted by environmental laboratories and participated in hands-on training in data and QA/QC evaluation.

Mr. Baldwin has prepared Data Usability Summary Reports (DUSRs) for numerous chemical analytical datasets for projects overseen by the USEPA, NYSDEC and other regulatory agencies. Datasets evaluated have included soil, sediment, surface water, groundwater, soil vapor, indoor air and ambient air.

Mr. Baldwin has performed forensic assessments of historic environmental chemical analytical data to resolve apparent discrepancies with modern data and other dataset inconsistencies.
Mr. Baldwin has interpreted numerous organic parameter datasets to evaluate breakdown sequences, likely original parameters and rates of degradation.

Mr. Baldwin has formulated numerous chemical treatment plans for in-situ remediation of environment contaminants, including assessment of contaminant concentrations and distribution, chemical processes and indicators, natural attenuation indicators, additional stociometric demands and hydrogeologic factors.

GENERAL EXPERIENCE

Mr. Baldwin has extensive experience in the selection, design, installation and maintenance of a wide range of soil and groundwater remediation systems. Remedial systems have included both active and passive free-product recovery, traditional groundwater pump and treat, soil-vapor extraction, air sparging, bioventing, bioremediation, sub-slab depressurization, excavation impacted-soil management and natural attenuation.

Mr. Baldwin has been responsible for conducting and supervising many permit-acquisition and compliance projects associated with sewage discharges, State Pollutant Discharge Elimination System (SPDES) discharges, wetlands, etc. He has conducted these services in a wide-range of venues including New York City, Town of Southold, City of Glen Cove, Cape Cod, Suffolk County, etc.

Mr. Baldwin has been involved in hundreds of subsurface soil and groundwater investigations ranging from Phase I & II Environmental Site Assessments (ESAs) to Remedial Investigations. Investigation and delineation techniques have included soil borings, groundwater monitoring well networks, hydropunch/GeoProbe sampling, surface and bore-hole geophysical methods, soil-gas surveys, aquifer testing, surface water and sediment sampling, waste characterization (soils piles, drums, USTs, ASTs, landfills, etc.), test pits, and computer fate and transport modeling. Materials investigated have included petroleum products (heating/fuel oil and gasoline), PCB oils, coal tar, heavy metals, chlorinated solvents, explosives, pesticides, herbicides and buried medical waste.

Mr. Baldwin has also been the principal-in-charge of many building materials investigations associated with the potential presence of asbestos-containing materials (ACM), lead-based paint (LBP), fugitive dusts, volatile organic compounds (VOCs), etc. Many of these project lead to the design and implementation of abatement projects.

PROJECT EXPERIENCE

FPM Group, Multiple Sites, NY: Mr. Baldwin provided FPM Group with independent data validation services and prepared NYSDEC, DER-10-compliant DUSRs for multiple sites located in Suffolk and Nassau Counties and New York City. Projects have included multiple matrices including soil, groundwater and soil vapor/indoor air for multiple NYSDEC analyte groups including TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticides, TAL metals, PFAS and 1,4-dioxane.

ConEd, New York City, NY: Participated in a long-term stormwater monitoring project at several ConEd facilities. The work included the collection and analyses of quarterly composite samples of liquids from on-site stormwater abatement systems per each facility's New York City Department of Environmental Protection (NYCDEP) discharge permit.

Industrial Project, Glen Cove, NY: Conduct of a large-scale New York State Department of Environmental Conservation (NYSDEC) Resource and Recovery Act (RCRA) Closure project conducted at a large, former industrial site located in Glen Cove, NY. Mr. Baldwin was responsible for preparing, submitting and receiving NYSDEC approval for all project-related work plans, and implementing the soil and groundwater investigation phases of the project. Based upon these data, the NYSDEC approved and oversaw to conduct a remedial action plan to address impacted soils across the 16-acre site. The project has been completed and the Closure Certification Report and Site Management Plan have been submitted to the NYSDEC.

Commercial Properties, Syosset, NY (Nassau County): Evaluation of several commercial / industrial facilities wherein Phase I / II ESA services were provided. Further, the project included the evaluation and reporting to the USEPA of evaluations of several of the facilities stormwater mitigation system in accordance with EPA UIC Well Program regulations. Mr. Baldwin was a critical evaluator of potential impacts to the subject properties associated with a VOC-impacted groundwater plume emanating from an upgradient, out-of-service landfill facility owned by a local municipality. He assisted the project attorneys in developing an acceptable indemnification agreement which protected his client from any future liability of pre-existing environmental conditions and laid the reasonability on the former property owner.

Ferry Terminal Project, Glen Cove, NY: The City of Glen Cove Industrial Development Agency (IDA) had acquired Federal Stimulus Funding to develop a ferry terminal along their waterfront area in order to provide passenger ferry service from the North Shore of Long Island to the New York Metropolitan Area, and potentially to selected Connecticut locations. The selected site was part of the former Li Tungsten and Captains Cove Federal and New York State Department of Environmental Conservation (NYSDEC) Superfund Sites. Both sites were subject to remedial actions and were "closed" by both the United States Environmental Protection Agency (USEPA) and NYSDEC circa 2000. A wide range of contaminant types were potentially associated with both sites including solvents, petroleum, oils, heavy metals and radiation. The NYSDEC and IDA required the preparation of a Soil Management Plan (SMP) as potentially impacted soils and bottom sediments were potentially going to be encountered as part of the project. Mr. Baldwin successfully prepared and executed a Dredging / Excavation (D / E) Work Plan which detailed the requirements to field screen all excavated soils and dredge spoils with a radiation detector, photo-ionization detector (PID) and by visual / olfactory inspection.

Based upon the results of the field screening, excavated soils and dredge spoils were to be addressed by one of the following: 1) cleared for use as on-site backfill materials; 2) disposed of as non-hazardous, regulated materials; or, 3) as hazardous waste. Mr. Baldwin was also responsible for designing and implementing a sediment sampling and analyses program to: 1) evaluate ambient creek bottom conditions with respect to a wide-range of contaminant types; and, 2) confirm the chemical conditions of the "new sea floor" prior of dredging and excavation activities. Mr. Baldwin also successfully applied for a received a NYSDEC Case-specific Beneficial Use Determination (BUD) finding as part of a cost-effective materials disposal option, as well as successfully applying for a NYSEC Long Island Well permit required as part of continuing project support activities.

Marina Property Assessment, Hampton Bays, NY: The owner of this active marina facility was served with a Notice of Violation (NOV) by the NYSDEC for various environmental issues, mostly related to on-site petroleum storage / delivery systems, as well as impacts potentially associated with marine-activity uses such as vessel bottom paint removal and application, use of preserved woods, vessel maintenance activities, housing-keeping issues, etc. Mr. Baldwin was responsible, with input from the

NYSDEC, for developing and implementing a Site Investigation Program to investigate potential soil and groundwater impacts associated with the aforementioned on-site practices. Based upon the results of the investigation, it was concluded that the fuel distribution system was not leaking and that groundwater was not deleteriously impacted. Minor areas of impacted soil, likely from vessel bottom cleaning activities, were identified. Mr. Baldwin prepared and implemented a NYSDEC-approved Remedial Action Plan which included the following: 1) targeted removal of metals-impacted soils; 2) conversion of the existing gasoline/diesel UST/sub-grade distribution system to non-regulated biofuel use; 3) confirmation of facility use of aboveground storage tanks (ASTs) equipped with double-walled containment, 4) permitting a vessel-washing rinsate containment/treatment system; and, 5) use of asphaltic/concrete paving as engineering controls to minimize future potential user contact with remaining impacted soils.

Landfill Gas Evaluation, Shopping Center, Uniondale, NY: Mr. Baldwin provided environmental consulting services to the owner of a property improved with a strip mall including two large big box-type stores. Due to the presence of historic landfill materials, the on-site buildings were equipped with a sub-slab depressurization system (SSDS) to address methane vapors. The methane vapors required mitigation measures due to building occupants' complaints of strong odors, and to address the potential build-up of methane within the building envelopes which could potentially result in an explosion hazard. The Client received correspondence from the Nassau County Department of Health (NCDH) inquiring why the methane SSDS was apparently not operating, if landfill-related vapors were still present requiring the operation of a SSDS and/or what remedial measures were to be implemented, if warranted. The services include the review of available historic documentation, inspection of the then non-operating methane SSDS, measuring sub-slab vapor and indoor air conditions, providing guidance to the client regarding appropriate remedial measures and support with respect to regulatory communications.

Expedited Due Diligence of Shopping Center, Centereach, NY: A private developer/REIT was considering the purchase of a shopping center and, due to contract restraints, the client required the acquisition of due diligence information on an expedited basis. Based upon review of existing environmental reports, there had formerly been a dry cleaner at the facility. Additionally, the overall facility was improved with several on-site sanitary waste disposal systems and a stormwater abatement system consisting of several dozen dry wells. Due to the facility's location on Long Islands flow divide, a site-specific groundwater flow direction could not be determined. Therefore, several multi-depth monitoring wells were installed, surveyed and sampled to determine a site-specific groundwater flow direction. Additional monitoring wells were then installed and sampled to confirm groundwater quality conditions downgradient of on-site infrastructure of concern. An expedited Phase II sampling program was designed and implemented to assess the highest-risk issues including potential impacts to groundwater and soil vapor associated with the former dry-cleaning uses and potential remediation costs associated with on-site cesspools and drywells. The results of the investigation indicated a high risk associated with potential soil vapor intrusion issues and the initial remedial costs to address the on-site leaching structures was higher than originally anticipated.

Day Care Facility, Due Diligence, Soil Management and Soil Vapor Mitigation: Based upon the results of previous Phase I/II ESA activities which identified the presence of impacted fill at the facility slated for development by a non-for-profit day care facility, designed and implemented a Soil Management Plan which allowed for the re-development of the site. Additionally, design, installed and operated a large-scale sub-slab depressurization system (SSDS) to address soil vapor intrusion concerns.

Multiple Agricultural Properties, Suffolk County, NY: These projects were typically related to the former legal application of pesticides to support agricultural operations on projects slated for residential re-development. Project work-flow components included the following: 1) Design and conduct of soil sampling and analyses programs designed to support residential re-use in accordance with SCDHS

guidelines; 2) Conduct of pilot testing to evaluate various pesticide-impacted soil management techniques, including various vertical soil mixing options; 3) Preparation of SCDHS-compliant SMPs to be conducted during the re-development of the properties; and, 4) Oversight of execution of SMPs including air monitoring, collection/analyses of confirmatory soil samples and preparation of project close-out packages.

Private Developer, Due Diligence and Soil Remediation of a Former Landfill Facility, Central Islip, NY: This project included the conduct of Phase I/II activities for a nation-wide developer at this site which was the improved with infrastructure associated with a sewage treatment plant and landfill associated with a former psychiatric facility. The data indicated the presence of fill materials which were impacted by lead in contravention of regulatory guidance values. A SMP was designed and implemented in which on-site landfill materials were screened and tested. Screened materials containing acceptable levels of lead were used as on-site backfill while lead-impacted materials were disposed of off-site. The design and implementation of the SMP allowed the developer to deal with impacts in a cost-effective fashion and resulted in a profitable residential-use project.

UIC Well Evaluation/Remediation, Multiple Clients, Nassau and Suffolk Counties, NY: These projects included environmental investigation and remediation of multiple facilities located in both Suffolk County and Nassau County associated literally thousands of cesspool and stormwater drywell Underground Injection Control Wells (UIC). This Long Island-specific issue is due to the presence of a Federally-designated Sole Source Drinking Water aquifer underlying Long Island, and the long-standing practice of discharging liquid wastes and stormwater through UIC structures. Worked closely with property owners and appropriate regulatory agencies to successfully remediate impacted UIC structures across Long Island with regulatory oversight provided with the SCDHS, Nassau County Department of Health and/or the USEPA.

Cemetery Groundwater Study, Suffolk and Nassau Counties, NY: A religious organization petitioned a western Long Island municipality to increase the size of an existing Nassau County cemetery facility. As part of their SEQRA review, the municipality raised the concern of the potential impacts of embalming fluids and other chemicals associated with interred bodies may have on the underlying aquifer system. The project included evaluating the typical types of embalming materials formerly and currently in use (e.g., formaldehyde, arsenic, lead, etc.), as well as radioactive materials typically utilized for hospital diagnostics and therapy purposes. Conduct of groundwater evaluations at two in-service facilities owned by the Client and collection of groundwater samples for analyses of VOCs, metals, alpha/beta/gamma emitters and typical radio-therapy/diagnostic drugs. Prepared a report summarizing the results of the two groundwater investigations for inclusion into the SEQRA-required DEIS.

New York State Owned Educational Facility, Wassaic, NY: The focus of this project was to evaluate the source area of methyl tertiary butyl ether (MTBE) which was detected the facility's potable water system (the source of the potable water was high-capacity wells completed in the local valley-fill aquifer). An additional project component was to design and implement an effective water treatment system in event that the MTBE exceeded NYSDEC standards in the future. Project work-flow components included the following: 1) Conduct of a surface geophysical survey utilizing seismic techniques between the identified source area and the potable water-supply well field to evaluate the depth and geometry of the unconsolidated materials/bedrock interface; 2) Conduct of a multi-depth groundwater investigation between the source area (gasoline service station) and the well field to confirm the nature and extent of contamination utilizing the direct-push sampling technique; 3) Design and installation of a multi-depth monitoring well network in the vicinity of the facility's potable water wells for aquifer testing purposes; 4) Conduct of a long-term aquifer pumping test, the data which were utilized to calculate the capture zone of the pumping, potable-water wells under operational conditions; 5) As an IRM, one impacted potable water well was converted to a remediation well to provide hydraulic capture of the MTBE plume prior to its impacting the remaining downgradient wells. The effluent was

treated via a large-scale granulated-activated carbon (GAC) system for treatment of MTBE prior to its permitted discharge to a nearby stream; 6) A 40,000-pound GAC unit was also installed in standby mode to address the facility's drinking water should the concentrations of MTBE ever warrant treatment; and 7) Conduct of an AS/SVE pilot test at the source area (upgradient gasoline service station) to support the design of an effective, source area remediation program.

Multiple NYCDDC Fire Department / Police Precinct Facilities, New York City, NY: These projects were related to the letting of multiple contracts for site remedial activities associated with New York City fire department facilities and police precinct facilities by the New York City Department of Design and Construction (NYCDDC). Project work-flow components included the following: 1) Evaluating the geologies of several sites to evaluate and implement successful oxygen-releasing compound (ORC) projects; 2) Review of quarterly groundwater quality and potentiometric surface data to confirm existing conditions; 3) Assessing the best methodologies to implementing enhanced natural attenuation remedial techniques by addition of nutrients and non-native, engineered bacterial populations; and, 4) Conduct of hi-vac extractions to remove light, nonaqueous-phase liquids as a remedial measure.

Rite Off RI/FS, IRM and Remedial System: This was a NYSDEC Class II Inactive Hazardous Waste Site. Project work-flow components included the following: 1) Design and conduct of an on-site and off-site RI which including installation of several multi-depth wells, collecting and reviewing chemical analytical data, preparing potentiometric surface maps and conducting computer groundwater modeling (i.e., MODFLOW, MODPATH, AQTESOLVE and MT3D); 2) Design and conduct of an IRM which consisted of removing the contaminated bottom sediments (e.g., source area materials) from impacted EPA-designated Class V injection wells; and, 3) Design and installation of the NYSDEC-approved remedy of an air sparge/soil vapor extraction (AS/SVE) system. Specific tasks including conducting AS and SVE pilot testing, overseeing installation of treatments wells, overseeing the design and installation of the treatment system, conduct of monthly operation and maintenance (O&M) activities and quarterly collection and analyses of groundwater samples from the on-site and off-site monitoring wells.

Saint George Ferry Terminal Redevelopment, Staten Island, NY: Provided environmental project support associated with the redevelopment of this ferry terminal related to the removal of out-of-service No. 6 fuel oil USTs, and associated impacted soil and groundwater. Project work-flow components included the following: 1) Design and installation of an on-site groundwater monitoring well network required to support the eventual de-watering of the area to allow for the removal of the USTs. Included soil logging, and evaluation of soils and groundwater for potential petroleum impacts; 2) Conduct of a tidal influence study to support groundwater modeling including the preparation of high-tide and low-tide potentiometric surface maps; 3) Design and conduct of an aquifer analyses program including a step-drawdown test (to evaluate appropriate aquifer testing flow rate) and conduct of a 72-hour aquifer pumping test to support the design of a de-watering system; 4) Conduct of computer modeling (VISUAL MODFLOW) utilizing the data associated with the aforementioned aquifer analyses to evaluate de-watering scenarios; and, 5) Design and installation of a coffer-dam-like system surrounding the USTs to minimize the amount of required de-watering to support their removal.

Mitchell Park Development, Greenport, NY: Managed one of the first NYSDEC Brownfield projects on Long Island which was funded utilizing NYS Environmental Bond Act funds. Project included the full evaluation of the geologic and environmental conditions of the property including the following work flow components: 1) Conduct of a geophysical survey including ground-penetrating radar (GPR) and electromagnetics to evaluate for the presence of out-of-service USTs and other subsurface infrastructure; 2) Conduct of soil borings and associated soil logging to confirm subsurface lithologic conditions of potential environmental impacts; 3) Installation and sampling of several on-site groundwater monitoring wells with preparation of associated potentiometric surface maps; 4) Conduct of a tidal influence study to evaluate potential effects that tides may have had on the migration of contaminants; 5) Oversaw the removal of several, on-site, out-of-service USTs with associated

collection and analyses of confirmatory, end-point soil samples; and, 6)Evaluated the nature and extent of imported soils which contained arsenic associated with agricultural uses and developed a Soil Management Plan to address same.

Blydenburgh Landfill Routine Groundwater Monitoring, Islip, NY: Supervised quarterly groundwater sampling, data tabulation, statistical analyses and reporting for a Long Island landfill under NYSDEC Part 360 regulations. Project work-flow components included the following: 1) Oversaw and conducted QA/QC checks of field crews collecting the groundwater samples; 2) Tabulated and conducted statistical evaluation of existing groundwater quality data to evaluate pre-operational groundwater quality conditions to establish "trigger contaminant levels" to determine if the in-service landfill leachate collection system was failing; 3) Tabulated and evaluated validated quarterly groundwater quality data against pre-operational groundwater quality statistics; and, 4) Conducted annual statistical evaluations of all operational groundwater quality data to confirm landfill was in compliance with NYSDEC landfill protocols.

Lockheed Martin Lake Success Site, **Lake Success, NY**: Managed large-scale site activities at this major aerospace facility which included ongoing IRMs (soil vapor extraction and groundwater pump and treat systems), citizen participation activities, design and implementation of on-site remedies, an off-site RI/FS, regulatory compliance activities, client interactions, multi-task and multi-contractor scheduling, coordination of staff and tasks, and general program management.

Project work-flow components included the following: 1) Oversaw collection and analyses of samples from an extensive on-site and off-site groundwater monitoring well network; 2) Managed the existing groundwater IRM treatment system which consisted of large granulated-activated carbon (GAC) filters; 3) Evaluated nature and extent of groundwater contaminant plume via the preparation of iso-concentration contaminant maps; 3) Prepared potentiometric surface maps to confirm hydraulic capture analyses of in-service pump and treat system; 4) designed and implemented an off-site groundwater investigation which included the conduct of bore-hole geophysical surveys to establish subsurface lithologies and water-bearing zones, installation of several clusters of multi-depth monitoring wells, collection and analyses of groundwater samples, preparation of potentiometric surface maps and preparation of groundwater plume maps; 5) Design and implementation of an NYSEC-approved IRM which consisted of the removal of impacted materials (e.g., source materials) associated with the EPA Class V injection wells associated with a former solvent still; 6) Utilized a computer groundwater modeling program (VISUAL MODFLOW) to evaluate aquifer properties, contaminant fate and transport, and evaluate potential groundwater extraction and injection scenarios; and, 7) Evaluated data acquired from multiple nearby public water districts to evaluate spatial and time-related groundwater extraction practices for public consumption uses from the vicinity of the site.

CONTINUING EDUCATION

- Princeton Groundwater Hydrogeology and Pollution course
- Environmental Law and Regulations Course, U.C. Berkeley Extension
- NGWA MODFLOW and MODPATH Modeling Course
- NGWA Visual MODFLOW Modeling Course

PROFESSIONAL REGISTRATIONS/CERTIFICATION/TRAINING

- Professional Geologist, License No. 000255, New York State
- Retired Professional Geologist, PG-000552-G, Commonwealth of Pennsylvania
- Certified Professional Geologist, CPG #9158, Amer. Inst. of Prof. Geologists
- OSHA Certification, 40-hour Health and Safety Training at Hazardous Waste Sites

CASTLETON ENVIRONMENTAL

APPENDIX B

APPENDIX C- SAMPLING PROTOCOLS FOR PFAS IN MONITORING WELLS AS PER NYSDEC SAMPLING, ANALYSIS, AND ASSESSMENT OF PER AND POLYFLUOROALKYL SUBSTANCES (PFAS) UNDER NYSDEC'S PART 375 REMEDIAL PROGRAMS

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

CASTLETON ENVIRONMENTAL

APPENDIX C

PACE ANALYTICAL SERVICES
ENV-SOP-MANS-0111 V01 PREPARATION AND ANALYSIS OF PFAS IN AQUEOUS, SOLID, AND TISSUE BY EPA METHOD 1633

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

Pace ANALYTICAL SERVICES	**ENV-SOP-MANS-0111 v01 Preparation and Analysis of PFAS in Aqueous, Solid, and Tissue by EPA Method 1633**
	Effective Date: 08/07/2024

Management Approval:
John Trimble Approved on 8/7/2024 11:55:41 AM
Laura Vanasse Approved on 8/7/2024 11:32:33 AM
Pete Henriksen Approved on 8/7/2024 10:20:05 AM
Jason Hebert Approved on 8/7/2024 12:02:07 PM

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1.0 SCOPE & APPLICATION

This standard operating procedure (SOP) describes the laboratory procedure used by Alpha, a Pace Analytical Laboratory for the determination of the per- and polyfluoroalkyl substances (PFAS) by liquid chromatography/mass spectrometry (LC-MS/MS) following EPA 1633, published January 2024. This SOP is applicable to aqueous (all non-potable water and leachate), solid (soil, biosolids, sediment), and tissue matrices.

The instrumental portion of this method is for use only by analysts experienced with LC-MS/MS or under the close supervision of such qualified persons. The laboratory must demonstrate the ability to generate acceptable results using the procedures in Sections 11.3.1 and 11.3.2.

By their very nature, many components of PFAS present analytical challenges unique to this class of analytes. For example, PFAS analytes readily adhere to the walls of the sample containers and may also stratify in the container.

1.1 Target Analyte List, Limits of Detection & Quantitation (LOD & LOQ)

The target analytes that can be determined by this SOP and the associated LODs and LOQs are provided in Appendix A, Tables 1, 2, and 3.

LOQs are established in accordance with PAS policies and procedures for method validation, determination of detection limits (LOD), and quantitation limits (LOQ). Refer to laboratory SOP ID 1732 (Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ)) for additional information. DL and LOQ are routinely verified and updated when needed. DL and LOQ are always adjusted to account for actual sample amounts used and for dilution.

The reporting limit (RL) is the value to which analytes are reported as detected or non-detect in the final report. When the RL is less than the lower limit of quantitation (LLOQ), all detections and non-detects at the RL are qualitative. The LLOQ is the lowest point of the calibration curve used for each target analyte.

1.2 Reference Methods & Documents

This SOP is based on reference method EPA 1633 (2024). If the laboratory procedure is modified from the reference method, a list of modifications and rationale for the modifications is provided in Section 14.0. Modifications are permitted when allowed by the regulatory program for which test results will be used and when the modification has been validated comparable and equivalent to the reference method.

1.3 Quantitation Range

The quantitation range for each target analyte in this procedure is defined in Appendix A, Table 5: Calibration Standard Concentrations.

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1.4 Program Specific Requirements

Not Applicable.

2.0 SUMMARY OF METHOD

Environmental samples are prepared and extracted using method-specific procedures. Sample extracts are subjected to cleanup procedures designed to remove interferences. Analyses of the sample extracts are conducted by LC-MS/MS in the multiple reaction monitoring (MRM) mode. Sample concentrations are determined by isotope dilution or extracted internal standard quantification (see Section 9.2.1) using isotopically labeled compounds added to the samples before extraction.

Individual PFAS analytes are identified through peak analysis of the quantification and confirmation ions, where applicable. Where linear and branched isomers are present in the sample and either qualitative or quantitative standards containing branched and linear isomers are commercially available, the PFAS analyte is reported as a single analyte consisting of the sum of the linear and branched isomer concentrations.

Quantitative determination of target analyte concentrations is made with respect to an isotopically labeled PFAS standard; the concentrations are then used to convert raw peak areas in sample chromatograms to final concentrations.

Results for target analytes are recovery corrected by the method of quantification (i.e., either isotope dilution or extracted internal standard quantification, see Section 9.2.1). Recoveries of isotopically labeled extracted internal standards (EIS) are determined by comparison to the responses of one of seven non-extracted internal standards (NIS) and are used as general indicators of overall analytical quality.

The quality of the analysis is assured through reproducible calibration and testing of the extraction, cleanup, and LC-MS/MS systems.

- Aqueous samples are spiked with isotopically labeled standards (EIS), extracted using solid-phase extraction (SPE) cartridges and undergo cleanup using carbon before analysis.
- Solid samples are spiked with EIS, extracted into basic methanol, and cleaned up by carbon and SPE cartridges before analysis.
- Tissue samples are spiked with EIS, extracted in methanol with potassium hydroxide followed by acetonitrile, and cleaned up by carbon and SPE cartridges before analysis.

3.0 INTERFERENCES

Solvents, reagents, glassware, and other sample processing hardware may yield artifacts and elevated baselines causing misinterpretation of chromatograms. Specific selection of reagents and solvents is required.

Clean all equipment prior to, and after, each use to avoid PFAS cross-contamination. Typical cleaning solvents include water, methanol, and methanolic ammonium hydroxide. The residual PFAS content of disposable plasticware and filters must be verified by batch/lot number and may be used without cleaning if PFAS levels are less than the Method Detection Limit (MDL).

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Prior to use, glassware must be solvent rinsed and then air dried. A solvent rinse procedure using methanolic ammonium hydroxide (1%) and methanol is recommended.

Sample manifold ports and transfer tubing should be inspected regularly for signs of wear and/or discoloration. When such observations are made, the associated components should be replaced.

All parts of the SPE manifold must be cleaned between samples by rinsing with methanolic ammonium hydroxide (1%) and air drying prior to use. Smaller parts, like the needles, adapters, reservoirs, transfer lines, and stopcocks associated with the manifold should be rinsed with tap water prior to rinsing with methanolic ammonium hydroxide (1%) and air drying. After loading the samples but prior to elution procedures, the chamber should be rinsed with methanolic ammonium hydroxide (1%).

All materials used in the analysis must be demonstrated to be free from interferences by running method blanks (Section 11.1.1) at the beginning and with each extraction batch (samples started through the extraction process on a given batch to a maximum of 20 field samples).

Reagent water (Section 8.1) can be used to simulate water samples and Ottawa sand and/or reagent-grade sand (Section 7.3) can be used to simulate soils. Fish fillets (tilapia/ cod), chicken breast or other similar animal tissue (see Section 7.3) may be used as the reference matrix for tissue. The laboratory must verify that the source product used does not contain PFAS in detectable amounts.

Interferences co-extracted from samples will vary considerably from source to source, depending on the diversity of the site being sampled. Interfering compounds may be present at concentrations several orders of magnitude higher than the native PFAS. Because low levels of PFAS are measured by this method, elimination of interferences is essential. The cleanup steps given in Section 9.3 can be used to reduce or eliminate these interferences and thereby permit reliable determination of the PFAS at the levels shown in Tables 1, 2 and 3. The most frequently encountered interferences are fluoropolymers; however, bile salts (e.g., Taurodeoxycholic Acid [TDCA]) may be present in various matrices, including fish and wastewaters, and can interfere in the chromatography. For this reason, analysis of a standard containing TDCA is required as part of establishing the initial chromatographic conditions (see Sections 8.3.2 and 8.3.3) and each analytical sequence (see Section 9.4).

4.0 DEFINITIONS

Refer to the Laboratory Quality Manual for a glossary of common lab terms and definitions.

- **Extracted Internal Standard (EIS) quantification:** The response of the target compound is compared to the response of the isotopically labeled analog of another compound with chemical and retention time similarities.
- **Isotope dilution (ID) quantitation:** A means of determining a naturally occurring (native) compound by reference to the same compound in which one or more atoms has been isotopically enriched. The labeled PFAS are spiked into each sample and allow identification and correction of the concentration of the native compounds in the analytical process.
- **Isotopically labeled compound:** An analog of a target analyte in the method which has been synthesized with one or more atoms in the structure replaced by a stable (non-radioactive) isotope of that atom. Common stable isotopes used are 13C (Carbon-13) or Deuterium (D or 2H). These labeled compounds do not occur in nature, so they can be used for isotope dilution quantitation or other method-specific purposes.

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- **Minimum Level of quantitation (ML):** The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. The ML represents the lowest concentration at which an analyte can be measured with a known level of confidence. It may be equivalent to the concentration of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.
- **PAS:** Acronym for Pace® Analytical Services, LLC

5.0 HEALTH & SAFETY

The following sections provide general health and safety information about chemicals and materials that may be present in the laboratory.

- The toxicity or carcinogenicity of each chemical material used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable.
- The laboratory maintains documentation of hazard assessments and OSHA regulations regarding the safe handling of the chemicals specified in each method. Safety data sheets for all hazardous chemicals are available to all personnel. Employees must abide by the health, safety and environmental (EHS) policies and procedures specified in this SOP and in the Pace® Chemical Hygiene / Safety Manual (COR-MAN-0001).
- Personal protective equipment (PPE) such as safety glasses, gloves, and a laboratory coat must be worn in designated areas and while handling samples and chemical materials to protect against physical contact with samples that contain potentially hazardous chemicals and exposure to chemical materials used in the procedure.
- Concentrated corrosives present additional hazards and are damaging to skin and mucus membranes. For procedures that require use of acids, use acids in a fume hood whenever possible with PPE designed for handing these materials. If eye or skin contact occurs, flush with large volumes of water. When working with acids, always add acid to water to prevent violent reactions. For procedures that that emit large volumes of solvents (evaporation/concentration processes), these activities must be performed in a fume hood or apparatus that reduces exposure.

6.0 SAMPLE COLLECTION, PRESERVATION, HOLDING TIME & STORAGE

PAS does not offer sample collection services for this test method. PAS advises customers to collect samples in accordance with a sampling plan and collection procedures appropriate to meet regulatory requirements and data quality objectives for the project. The minimum sample amounts required for the test are provided in this section.

PAS provides containers for the collection of samples upon client request. The routine container type and size is provided in the following table along with requirements for sample size, preservation and holding time. Refer to Bottle Order Preparation (ENV-SOP-WEST-0005), or however named, for procedures related to preparation of bottle kits.

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Container Type, Minimum Sample Amount, Preservation, and Holding Time

Matrix	Container Size & Type[1]	Minimum Sample Amount[2]	Preservation	Holding Time
Aqueous (non-potable water)	2 x 500 mL linerless HDPE 1 x 125 mL linerless HDPE[3]	500 mL	Thermal: 0-6°C (or ≤ -20°C)	Collection to Preparation: 28 Days (or 90 Days) Preparation to Analysis: 28 Days
Aqueous (leachate)	2 x 125 mL linerless HDPE	100 mL	Thermal: 0-6°C (or ≤ -20°C)	Collection to Preparation: 28 Days (or 90 Days) Preparation to Analysis: 28 Days
Solid (sediment and soil)	3 oz/ 90 mL linerless polypropylene wide mouth	5 g	Thermal: 0-6°C or ≤ -20°C	Collection to Preparation: 90 Days Preparation to Analysis: 28 Days
Solid (biosolid)	3 oz/ 90 mL linerless polypropylene wide mouth	0.5 g	Thermal: 0-6°C or ≤ -20°C	Collection to Preparation: 90 Days Preparation to Analysis: 28 Days
Tissue[4]	3 oz/ 90 mL linerless polypropylene wide mouth	2 g	Thermal: ≤ -20°C	Collection to Preparation: 90 Days Preparation to Analysis: 28 Days

[1] *Default container type provided in sample kit. To allow room for expansion during freezing (if necessary), aqueous sample containers should not be overfilled. Aqueous sample containers should be filled only to the appropriate gradation marked on the container, or to the shoulder of the container if no gradations are provided.*

[2] *Nominal amount of sample required for each discrete test. Solid and biosolid sample amounts reflect dry weight.*

[3] *Used for pre-screening analyses.*

[4] *Container listed here will be used for tissue homogenate; samples may be received at the laboratory as whole fish or filets wrapped in aluminum foil or food grade polyethylene wrap. Ideally fish should be frozen upon collection and shipped to the laboratory as soon as possible.*

Note: Project-specific requirements dictate which storage condition applies. The storage condition to be used for each project must be formally documented in written form (QAPP or otherwise) before samples are received. Without any prior indication from the client, the lab will store all aqueous and solid/biosolid samples at 0-6°C until extraction, with a 28-day holding time (collection to prep) for aqueous matrices and a 90-day holding time (collection to prep) for solid/biosolid matrices.

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Thermal preservation is checked and recorded on receipt in accordance with laboratory SOP (ENV-SOP-WEST-0003, Sample Receipt and Login), or however named.

After receipt, samples are stored as listed above until sample preparation. Prepared sample extracts of all matrices are stored at 0-6°C until sample analysis.

After analysis, samples are retained as stated in the Pace® standard terms and conditions, unless otherwise specified in the analytical services contract. Samples are then disposed of in accordance with Federal, State, and Local regulations.

7.0 EQUIPMENT & SUPPLIES

Use of equivalent instrumentation, support equipment, and supplies from alternative vendors is acceptable so long as they meet the specifications as stated in the reference method.

Due to the possibility of adsorption of analytes onto glass, plastic containers are used for all standard, sample, and extraction preparations. Any time a new lot of SPE cartridges, solvents, cryovials, or autosampler vials are used, it must be demonstrated that a MB is reasonably free of contamination and that the criteria in Section 11.1.1 are met.

7.1 Instrumentation

- High-performance liquid chromatograph (HPLC) equipped with tandem quadrupole mass spectrometer – Sciex 5500+ or equivalent
- Agilent Zorbax RRHD Eclipse Plus C18, 2.1 x 50 mm (1.8 µm) analytical column (Agilent Part # 959757-902), or equivalent
- Guard cartridge/column – Agilent Zorbax Eclipse Plus C18, 2.1 x 5 mm, 1.8 um (Agilent Part# 821725-901), or equivalent
- Trap/delay column – InfinityLab PFC Delay Column, 4.6 x 30 mm (Agilent Part# 5062-8100), or equivalent

7.2 Support Equipment

- Oven – Capable of maintaining a temperature of 105 ± 5 °C
- Analytical balance – Capable of weighing 0.0001 g
- Top loading balance – Capable of weighing 0.01 g
- Calibrated mechanical variable volume pipettes with disposable HDPE or polypropylene tips (10 µL to 5 mL) – used for preparation of calibration standards and spiked samples
- Point of Use water preparation system – Thermo Scientific Barnstead E-Pure; model 7119 – Used for QC samples to verify the systems are PFAS free
- Ultrasonic mixer – Fisherbrand; Model CPX3800 – 5.7L, 40 kHZ, 120V, 2.9 Amp with timer
- Analog or digital vortex mixer, single or multi-tube (Fisher Scientific 02-215-452, or equivalent)
- Variable speed mixing table (VWR Model 3500 Orbital Shaker, or equivalent)

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- Centrifuge (Beckman Allegra 6, Hettich Rotanta 460, or equivalent), capable of reaching at least 3000 rpm (~2000 RCF)
- Vacuum Pump – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges. GAST model # DOA-P704-AA, Waters Cat# 725000417, 115V, 60Hz, 4.2A
- Vacuum manifold for SPE Cartridges – Waters Cat# WAT200609: SPE Vacuum manifold, or equivalentCat
- Vacuum tubing – 1/4" ID, 5/8" OD, 3/16" wall; Fisher Scientific part# 14-176-6B or equivalent
- PE Transfer tubing – 1/8" X .062 x 500ft, Freelin Wade part# 1C-109-10 or equivalent.

7.3 Supplies

- Solid Phase Extraction (SPE) cartridges – Phenomenex part# CS0-9216, 250 mg WAX/20mL, or equivalent
- Carbon Cleanup cartridges – Phenomenex part# 8B-S528-CAJ, 50 mg GCB, or equivalent
- SPE reservoirs – 60 mL, Phenomenex part# AH0-7189, or equivalent
- SPE adapter caps – Supelco part# 57267 (Adapter cap for 12, 20 & 60 mL SPE tubes)
- Disposable liners for Vacuum Manifold – Waters part# 20685 or equivalent
- Silanized glass wool (Pyrex 3950 or equivalent)
- Reference matrix: Aqueous – reagent water
- Reference matrix: Solid – Ottawa sand
- Reference matrix: Tissue – fish fillets, chicken breast or similar animal tissue. First preference will be frozen cod fillets.
- Bottles – HDPE or PP, with linerless HDPE or polypropylene caps. Various sizes. QEC item # 6212-Q016/BC-150-PACE (500 mL), 6212-Q008BC-P (250 mL), 6213-U004BC-P (125 mL), 6214-003PPGBC-P (90 mL)
- Screw top vials, Polypropylene 0.7-mL with polypropylene caps – used in sample analysis and pre-screening (Waters Cat # 186005219 and 186004169 or equivalent)
- 15- and 50-mL conical polypropylene tubes with polypropylene screw caps for preparing and storing extract solutions and for collection of eluents (Fisher Scientific 05-527-90 and 14-432-22, or equivalent)
- 500-mL conical polypropylene centrifuge bottles for sample centrifugation (Fisher Scientific 07-200-621 or equivalent)
- Extract/Standard storage containers – 15-mL, 8-mL, or 4-mL narrow-mouth HDPE container - Thermo Scientific item# 2002-9050, 2002-9025, 2002-9125; 2.0-mL screw-top polypropylene cryogenic vials – Grainger item# 6EMV1/ Wheaton item# W985872;1.5-mL snap-cap polypropylene microcentrifuge tubes - Fisher item# 05-408-129; or equivalent
- pH Paper, range 0-14 - (VWR Cat# BD3539.606 or equivalent), 0.5-unit readability

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- Disposable glass and plastic pipets

8.0 Reagents & Standards

Refer to laboratory SOP (ENV-SOP-MANS-0112, Reagent, Solvent, and Standard Control), or however named, for information regarding standard and reagent tracking and traceability. All reagents and stock standards are commercially prepared, when available. Expiration and storage requirements are defined per manufacturer.

8.1 Reagents

Use of equivalent reagents from alternative vendors is acceptable so long as the substitution meets the performance specifications required by the reference method.

- Acetic acid – ACS grade or equivalent, store at room temperature; VWR cat# BDH3098-3.8LP or equivalent
- Acetonitrile – UV grade or equivalent, verified before use, store at room temperature; Honeywell Cat# 018-4 or equivalent (for extraction)
- Ammonium acetate – ACS or equivalent, store at 2-8° C, replace 2 years after opening date; VWR BDH9204-500G or equivalent.
- 1M aqueous ammonium acetate (Waters Cat# 186006693-1) used for mobile phase additive; store as indicated by manufacturer.
- Ammonium hydroxide – certified ACS+ grade or equivalent, 30% in water, store at room temperature; Fisher A470-500 or equivalent
- Formic acid – greater than 96% purity or equivalent, store at room temperature; Acros 147930010 or equivalent
- Methanol – HPLC grade or better, 99.9% purity, store at room temperature; Honeywell CAT# 230-4 or equivalent
- Mobile Phase A – 2 mM ammonium acetate in 95:5 water/acetonitrile. Aliquot 0.4 mL of aqueous 5M ammonium acetate in 949.6 mL of water and 50 mL of acetonitrile. Alternatively, dissolve 0.154 g of neat ammonium acetate into 950 mL of water and 50 mL of acetonitrile. Store at room temperature; shelf life is 2 months.
- Mobile Phase B – Acetonitrile, Ultra HPLC grade or equivalent; OmniSolv AX0142-1 or equivalent
- Potassium hydroxide – certified ACS or equivalent, store at room temperature, replace after 2 years; Fisher P250-500 or equivalent.
- Reagent water – Laboratory reagent water, test by lot/batch number for residual PFAS content.

8.2 Standards

Use of equivalent standards from alternative vendors is acceptable so long as they are traceable to a national standard, when commercially available. Follow manufacturer's recommended storage conditions and expiration dates.

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8.2.1 Primary PFAS Standard

- EPA Method 1633 Native PFAS Standard mix from Wellington Laboratories (item# EPA-1633STK) – used to prepare the calibration standards and to spike the reference QC samples prepared/analyzed with every batch of samples. Also used to prepare an intermediate standard for calibration standard preparation and low-level QC sample spiking, as described below.

8.2.2 Secondary PFAS Standard

- Method 1633-PFCs-Calibration Standard mix from Absolute Standards (item# 65735) – used to prepare the ICV standard as described below.

8.2.3 Extracted Internal Standard (EIS)

- Mass-labelled PFAS Extraction Standard mix from Wellington Laboratories (item# MPFAC-HIF-ES) – used to prepare analytical standards and spike each sample prior to extraction.

8.2.4 Non-extracted Internal Standard (NIS)

- Mass-labelled PFAS Injection Standard mix from Wellington Laboratories (item# MPFAC-HIF-IS) – used to prepare analytical standards and spike sample extracts prior to instrumental analysis.

8.2.5 Bile Salt (TDCA) Standard

- Neat Taurodeoxycholic acid from Cayman Chemical (item# 15935), or equivalent – used to prepare analytical standards for bile salt interference check.

8.3 Formulations

Prepare standard solutions from materials of known purity and composition or purchase as solutions or mixtures with certification to their purity, concentration, and authenticity. Observe the safety precautions in Section 5.

Purchase of commercial standard solutions or mixtures is highly recommended for this method; however, when these are not available, preparation of stock solutions from neat materials may be necessary. If the chemical purity is 98% or greater, the weight may be used without correction to calculate the concentration of the standard.

When not being used, store standard solutions in the dark at 4 °C, unless the vendor recommends otherwise, in tightly sealed screw-capped vials. Place a mark on the vial at the level of the solution so that solvent loss by evaporation can be detected. Replace the solution if solvent loss has occurred.

Note: 18O-mass labeled perfluoroalkyl sulfonates may undergo isotopic exchange with water under certain conditions, which lowers the isotopic purity of the standards over time.

The laboratory must maintain records of the certificates for all standards for traceability purposes. Copies of the certificates should be provided as part of the data packages in order to check that proper calculations were performed.

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8.3.1 Analytical and Preparation Reagents

Analytical and Preparation reagents are stored in plastic or glass containers under ambient conditions. Expiries are listed with each reagent.

- Instrument Blank Mix (IBLK Mix) – Methanol with 4% water, 1% ammonium hydroxide and 0.625% acetic acid – add ammonium hydroxide (3.3 mL, 30%), reagent water (1.67 mL) and acetic acid (0.625 mL) to methanol (94.4 mL); store at room temperature, replace after 1 month. This solution is used to prepare the instrument blank (Sections 8.3.3.3 and 9.2.5) and sample extract dilutions.
- Mobile Phase A – 2 mM ammonium acetate in 95:5 water: acetonitrile. Aliquot 2.0 mL of aqueous 1M ammonium acetate in 948 mL of water and 50 mL of acetonitrile. Store at room temperature; replace after 2 months or less.
- Mobile Phase B – Acetonitrile, HPLC grade or equivalent; Omnisolv AX0142-1 or equivalent
- Acetic acid (0.1%) - dissolve acetic acid (1 mL) in reagent water (1 L); store at room temperature, replace after 3 months.
- Aqueous ammonium hydroxide (3%) – add ammonium hydroxide (10 mL, 30%) to reagent water (90 mL), store at room temperature, replace after 3 months.
- Methanolic ammonium hydroxide (0.3%) – add ammonium hydroxide (1 mL, 30%) to methanol (99 mL), store at room temperature, replace after 1 month.
- Methanolic ammonium hydroxide (1%) – add ammonium hydroxide (3.3 mL, 30%) to methanol (97 mL), store at room temperature, replace after 1 month.
- Methanolic ammonium hydroxide (2%) – add ammonium hydroxide (6.6 mL, 30%) to methanol (93.4 mL), store at room temperature, replace after 1 month.
- Formic acid (aqueous, 0.1 M) – dissolve formic acid (4.6 g / 3.77 mL) in reagent water (1 L), store at room temperature, replace after 2 years.
- Formic acid (aqueous, 0.3 M) – dissolve formic acid (13.8 g / 11.31 mL) in reagent water (1 L), store at room temperature, replace after 2 years.
- Formic acid (aqueous, 5% v/v) – mix 5 mL formic acid with 95 mL reagent water, store at room temperature, replace after 2 years.
- Formic acid (aqueous, 50% v/v) – mix 50 mL formic acid with 50 mL reagent water, store at room temperature, replace after 2 years.
- Formic acid (methanolic 1:1, 0.1 M formic acid/methanol) – mix equal volumes of methanol and 0.1 M formic acid, store at room temperature, replace after 2 years.
- Methanolic potassium hydroxide (0.05 M KOH) – add 3.3 g of potassium hydroxide to 1 L of methanol, store at room temperature, replace after 3 months.

8.3.2 Intermediate Standards

Intermediate standards are stored in plastic containers as listed below. Expiries are listed with each formulation.

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- TDCA Stock Solution: Dissolve 10 mg of neat TDCA into 5 mL of MeOH; final concentration equals 2000 µg/mL. Store frozen (<0°C) when not in use; replace after 1 year, or sooner if degradation is observed.
- STK-10X Solution: Dilute 200 µL of EPA-1633STK with 1.8 mL of MeOH for a final volume of 2 mL; final concentrations vary by analyte – 25, 50, 100, 125, 250, or 625 ng/mL. Store at 0-6°C when not in use; replace every time a new lot of 1633STK is used, or after 1 month.

8.3.3 Working Solutions

Working solutions are stored in plastic containers under refrigerated conditions at 0-6°C and expire 1 month from the date of preparation.

8.3.3.1 Calibration Standards

A series of calibration solutions containing the target analytes and the EIS and NIS is used to establish the initial calibration of the analytical instrument. The concentration of the method analytes in the solutions varies to encompass the working range of the instrument, while the concentrations of the EIS and NIS (and TDCA) remain constant. The calibration solutions are prepared using the standards and intermediate standards described above. The final solvent composition will match the solvent mix of sample extracts, which contain methanol with 4% water, 1% ammonium hydroxide and 0.625% acetic acid. Calibration standard solutions do not undergo solid phase extraction/cleanup. Prepare the calibration standard solutions according to the table below. Following all formulations listed in this SOP will require 3 ampoules of the 1633STK mix to prepare a full calibration set; other final volumes may be prepared. If the lab follows all formulations in this SOP as written, the remaining volumes of 1633STK and STK-10X solutions after preparing the calibration should be enough to spike approximately 40 sets of aqueous batch QC. The remainder of MPFAC-HIF-ES and MPFAC-HIF-IS mixes should provide enough volume to spike approximately 40-45 samples.

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Component[1]	L1	L2 (LOQ)	L3	L4	L5 (CCV)	L6	L7	L8	L9
STK-10X	20	16	40						
EPA-1633STK				20	100	100	200	400	500
MPFAC-HIF-ES	25	10	10	10	25	10	10	10	10
MPFAC-HIF-IS	25	10	10	10	25	10	10	10	10
TDCA Stock	25				25				10
IBLK Mix	4905	1964	1940	1960	4825	1880	1780	1580	1470
Final Volume	5000	2000	2000	2000	5000	2000	2000	2000	2000

[1]*All values listed are µL*

8.3.3.2 Initial Calibration Verification Standard (ICV)

Prepare the ICV standard using the Absolute Standards 1633 PFC Mix, following the table below; expected concentration for all compounds in the ICV will be 10 ng/mL. The ICV is prepared from a separate, second source (or separate manufacturer lot) than that used for the calibration solutions. If a second source or lot is unavailable, a separate preparation using the same stocks is acceptable.

Component	Volume used (µL)
1633 PFC Mix	20
MPFAC-HIF-ES	20
MPFAC-HIF-IS	20
IBLK Mix	3940
ICV Final Volume	4000

8.3.3.3 Instrument Blank

A solvent blank is analyzed at the beginning of each analytical sequence, to demonstrate clean instrumental background, and after samples containing high levels of target compounds (e.g., calibration, CCV) to monitor carryover from the previous injection. The instrument blank consists of clean reagent fortified with the EIS and NIS for quantitation purposes. Prepare the IBLK using the IBLK mix (Section 8.3.1) and an appropriate volume of EIS and NIS; alternatively, prep the IBLK from 1887 µL of 1% Methanolic ammonium hydroxide, 80 µL of reagent water, 12.5 µL of acetic acid, and 10 µL each of EIS and NIS.

9.0 PROCEDURE

9.1 Equipment Preparation

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9.1.1 Instrument Setup

9.1.1.1 Routine Instrument Operating Conditions

Example LC Gradient

Step	Total Time (min)	Flow Rate (µL/min)	A: 5% Acetonitrile w/ 10mM Ammonium Acetate (%)	B: Acetonitrile (%)
1	0.00	400	80	20
2	6.00	400	0	100
3	6.50	400	0	100
4	6.51	400	80	20
5	8.50	400	80	20

Example MS Parameters

MS Parameter	Setting or Value
Sample Loop	100 µL
Injection Volume	2 µL
Column Oven Temperature	40° C
MRM Scan Window	60 sec
Curtain Gas (CUR)	30.0
Collision Gas (CAD)	9
Ion Spray Voltage (IS)	-4500 V
Source Temperature (TEM)	450° C
Ion Source Gas 1 (GS1)	30.0
Ion Source Gas 2 (GS2)	50.0

9.1.1.2 Mass Calibration

The mass spectrometer must undergo mass calibration to ensure accurate assignments by the instrument. This mass calibration must be performed at least annually to maintain instrument sensitivity and stability. Mass calibration must be repeated on an as-needed basis (e.g., QC failures, ion masses fall outside of the instrument required mass window, major instrument maintenance, or if the instrument is moved). Mass calibration must be performed using the calibration compounds and procedures prescribed by the manufacturer. The procedures used for mass calibration and mass calibration verification must evaluate an ion range that encompasses the ion range (Q1 and Q2 m/z) of the analytes of interest of this method.

9.1.1.3 Mass Calibration Verification

A mass calibration verification must be performed following mass calibration, prior to standard and sample analyses. Mass verification checks must also be performed after any subsequent mass calibrations. The laboratory must follow the instructions for the individual instrument software to confirm the mass calibration, mass resolution and peak relative response. If the manufacturer's

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instructions include options for evaluation of mass resolution, the tightest resolution requirements (typically called unit resolution) must be met.

9.1.1.4 Retention Time (RT) calibration

Once RT windows have been confirmed for each target analyte, EIS, and NIS compound, then once per ICAL and at the beginning of the analytical sequence, the position of all target analyte, EIS, and NIS peaks shall be set using the midpoint standard of the ICAL curve when ICAL is performed. When an ICAL is not performed, the initial CCV retention times or the midpoint standard of the ICAL curve can be used to establish the RT window position.

The RTs for the target analytes, EIS, and NIS compounds must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial daily CCV, whichever was used to establish the RT window position for the analytical batch. All branched isomer peaks identified in either the calibration standard or the qualitative (technical grade) standard also must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial daily CCV. For all target analytes with exact corresponding isotopically labeled analogs, target analytes must elute within 0.1 minutes of the associated EIS compound.

When establishing the chromatographic conditions, it is important to consider the potential interference of bile salts (i.e. TDCA) during analyses of samples. Analytical conditions must be set to allow a separation of at least 1 minute between TDCA and the retention time window of PFOS. The method requires this evaluation when establishing the chromatographic conditions, regardless of the sample matrices to be analyzed.

9.1.2 Support Equipment

Refer to laboratory SOP (ENV-SOP-WEST-0036 Balance Calibration Verification, ENV-SOP-WEST-0123 Pipette and Bottle Top Verification), or however named, for additional information on calibration requirements for support equipment that may be used in this procedure.

9.2 Calibration

Refer to corporate POL ENV-POL-CORQ-0005, *Acceptable Calibration Practices for Instrument Testing*, for general laboratory calibration policies and procedures.

9.2.1 Calibration Frequency

Prior to the analysis of samples, and after a successful mass calibration check, each LC-MS/MS system must be calibrated at a minimum of 6 standard concentrations (Section 8.3.3.1 and Appendix A, Table 5). This method procedure calibrates and quantifies 40 PFAS target analytes, using the isotopically labeled compounds added to the sample prior to extraction, by one of two approaches (see Appendix A, Table 4 for quantitation associations):

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- Isotope Dilution quantification (ID), whereby the response of the target compound is compared to the response of its isotopically labeled analog; twenty-four target compounds are quantified in this way.
- Extracted Internal Standard quantification (EIS), whereby the response of the target compound is compared to the response of the isotopically labeled analog of another compound with chemical and retention time similarities; sixteen target compounds are quantified in this way.

Each LC-MS/MS system must be calibrated whenever the laboratory takes corrective action that might change or affect the initial calibration criteria, or if either the CCV or ISC acceptance criteria have not been met.

Each time a modification is made to this method, the laboratory is required to repeat the procedure in Sections 11.3.1 and 11.3.2. If calibration will be affected by the change, the instrument must be recalibrated.

9.2.2 Calibration Levels

Calibration standards are stored in plastic containers under refrigerated conditions (0-6°C).

Concentrations for calibration solutions are presented in Appendix A, Table 5. A minimum of six contiguous calibration standards are required for a valid analysis when using a linear calibration model, with at least five of the six calibration standards being within the quantitation range (e.g., from the LOQ to the highest calibration standard). If a second-order calibration model is used, then a minimum of seven calibration standards are required, with at least six of the seven calibration standards within the quantitation range. The lowest level calibration standard must be at a concentration less than or equal to the Limit of Quantitation (LOQ) and must meet a signal-to-noise ratio of 3:1 for the quantitation and confirmation ions that exist and must meet ion ratio requirements described in Section 10.1.1.3. If the analyte has no confirmation ion, then a 10:1 signal to noise ratio is required. All initial calibration requirements listed in Section 9.2.4 and 9.2.5 must be met.

Note: Additional calibration standards, at levels lower than the lowest calibration standard listed in the method, may be added to accommodate a lower limit of quantitation if the instrument sensitivity allows. Calibration standards at the high end of the calibration may be eliminated if the linearity of the instrument is exceeded or at the low end if those calibration standards do not meet the S/N ratio criterion of 3:1 (for quantitation and confirmation ions that exist; 10:1 for analytes with no confirmation ion), so long as the required number of calibration points is met. All analytes with commercially available stable isotope analogues must be quantified using isotope dilution.

9.2.3 Calibration Sequence

Calibration standards must be analyzed in sequence from lowest to highest concentration to minimize the chance that carryover from a higher concentration standard will boost the area of a lower concentration standard. A typical sequence for days when calibration is required is shown below.

Description	Comment
ICAL L1	

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Description	Comment
ICAL L2	Also used as ISC (Section 9.2.4.4)
ICAL L3	
ICAL L4	
ICAL L5	Also used as bracketing/closing CCV (Section 9.2.4.5)
ICAL L6	
ICAL L7	
ICAL L8	
ICAL L9	
IBLK	Any detections must be <MDL
ICV	%R must be 70 – 130%
CCV (ISC)	%R must be 70-130%; begins and ends Analytical Sequence

9.2.4 Calibration Evaluation

If the criteria for initial calibration are not met, inspect the system for problems and take corrective actions to achieve the criteria. This may require the preparation and analysis of fresh calibration standards. All initial calibration criteria must be met before any samples or required blanks are analyzed.

9.2.4.1 Curve Fit

One of the following two approaches must be used to evaluate the linearity of the instrument calibration. Weighting (typically 1/x or 1/x2) is allowed for linear and non-linear regressions.

- Option 1: Calculate the relative standard deviation (RSD) of the Relative Response (RR) or Response Factor (RF) values of the initial calibration standards for each native compound and isotopically labeled compound. See Section 10.2.1 for calculation of RR and RF. The RSD must be ≤ 20% to establish instrument linearity.
- Option 2: Calculate the relative standard error (RSE) for each native compound and EIS compound for all the initial calibration standards that were analyzed. The RSE for all method analytes must be ≤ 20% to establish instrument linearity.

If these criteria cannot be met, corrective action should be taken to restrict the range of calibration, reanalyze and/or reprepare the ICAL standards, or perform instrument maintenance and/or re-optimization.

If more than the minimum number of standards are analyzed and levels are excluded from the calibration, only the lowest or highest standards may be excluded, except as noted here. The removal of calibration levels from the interior of the curve is allowed only when there is sound technical reason for doing so and when the level is removed for all analytes; for example, when it can be proven that the wrong standard was analyzed for the calibration level or there is obvious evidence that the instrument malfunctioned during injection of the standard. The removal of any calibration level from the interior of the curve must be approved by the department supervisor/manager. Management approval and

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the rationale for the level removal must be documented and kept with the technical record.

9.2.4.2 Relative Error (% RE)

Although not required by the method, it may be useful to compare the actual responses for each standard to the calibration model; percent error of >30% between the calculated and expected concentrations of an analyte in any standard may be cause for concern.

9.2.4.3 Initial Calibration Verification (ICV)

As part of the IDOC and once after each ICAL, analyze an ICV sample prepared from a second source (different from the source of the ICAL standards). If a second vendor is not available, then a different lot of the standard from the same vendor should be used. The ICV should be prepared and analyzed just like a CCV. Acceptance criteria for the ICV are identical to the CCVs: the calculated concentration for each analyte must be within ± 30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, correct the problem and rerun the ICV. If the problem persists, repeat the ICAL. Samples are not to be analyzed until the ICAL has been verified by acceptable ICV accuracy.

9.2.4.4 Instrument Sensitivity Check (ISC)

The lowest calibration standard within the quantitation range must be analyzed at the beginning of the analytical sequence. The signal-to-noise ratio of the ISC must be ≥ 3:1 for the quantification ions and the confirmation ions, or ≥ 10:1 if the analyte only has a quantification ion. Recovery of the native and EIS compounds for the ISC must be within 70-130%. If the requirements cannot be met, the problem should be corrected before analyses can proceed.

The lowest calibration standard within the quantitation range must be analyzed at the beginning of the analytical sequence. The signal-to-noise ratio of the ISC must be ≥ 3:1 for the quantification ions and the confirmation ions, or ≥ 10:1 if the analyte only has a quantification ion. Recovery of the native and EIS compounds for the ISC must be within 70-130%. If the requirements cannot be met, the problem should be corrected before analyses can proceed.

9.2.4.5 Continuing Calibration Verification (CCV)

After a passing MS resolution and a successful initial calibration is achieved and prior to the analysis of any samples, the calibration is verified by injecting an aliquot of the appropriate concentration ICAL standard, analyzed with the same conditions used during the ICAL. CCV is performed at the beginning of each analytical sequence, after every ten samples, and at the end of the analytical sequence. In this context, a "sample" is defined as a field sample: MBs, CCVs, LCSs, MSs, FDs, TBs and MSDs are not counted as samples. All CCV analyses are performed using a mid-level ICAL standard, except for the daily Instrument Sensitivity Check, as noted above.

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Calculate concentration for each native and EIS compound in the CCV; the recovery of native and EIS compounds for the CCVs must be within 70 – 130%. If the CCV criteria are not met, take corrective action (possibly including recalibration) and reanalyze any extracts that were analyzed between the last passing CCV and the one that failed. Alternately, the analyst may immediately analyze two CCVs for confirmation. If both confirmation CCV analyses meet the recovery criteria, analysis may proceed; however, the analyst must rerun any samples that were analyzed after the failing CCV and before the 2 passing CCVs. If either of the 2 confirmation CCV analyses fails to meet the acceptance criteria take corrective action and recalibrate the LC-MS/MS.

If an individual target compound recovery in a CCV is above the upper control limit and all associated samples are ND for that compound, the data for those samples may be reported. In such cases, a narrative statement must be included in the report indicating the specific compound result that was biased high in the CCV, and that samples were ND for that compound and thus reportable.

9.2.5 Initial Calibration Blank (ICB) / Continuing Calibration Blank (CCB)

One instrument blank (IBLK) is analyzed immediately following the highest ICAL standard analyzed (ICB), each analysis day prior to sample analysis, and following each bracketing CCV in a sequence (CCB), to check for carryover and instrument contamination. The concentration of each analyte must be ≤ the MDL-equivalent concentration in each IBLK/ICB/CCB. If the IBLK does not pass this requirement after the highest ICAL standard, the acquisition method should be adjusted to reduce the amount of carryover observed. Alternately, the calibration should be performed using a lower concentration for the highest standard until the acceptance criteria is met.

If unacceptable contamination is persistent in blanks, analyze additional instrument blanks until the response of the analyte is no longer detectable, or perform additional troubleshooting steps to identify and minimize other potential sources of PFAS contamination.

9.3 Sample Preparation

This section describes the sample preparation procedures for aqueous samples (Section 9.3.3), solid samples (soil, sediment or biosolid; Section 9.3.6), and tissue samples (Section 9.3.9). For solid samples, percent solids are determined using the procedures in Section 9.3.2. This section also describes the solid phase extraction (SPE) and extract cleanup protocols for all matrices.

Note: The laboratory may choose to pre-screen some samples prior to performing the analysis, following the protocol described in Appendix D. For aqueous samples, use the smaller secondary container to perform the pre-screening. If high levels of PFAS are present in the sample, a lower volume is required for analysis.

Do not use any fluoropolymer articles or task wipes in these extraction procedures. Use only HDPE or polypropylene wash bottles and centrifuge tubes. Reagents and solvents for cleaning may be kept in glass containers.

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9.3.1 Homogenization & Subsampling

Refer to laboratory SWI ENV-SWI-WEST-0128, Subsampling of Soil / Solid Samples, or however named, for information regarding the handling, homogenization, and splitting of samples to ensure that a representative aliquot is used for preparation.

The laboratory may subsample the aqueous samples as described in Appendix E; however, subsampling must meet project-specific requirements. The laboratory must notify the client that subsampling has occurred. Subsampling is acceptable for samples which require greater than a 10X dilution for over-range detections (or are known/expected to be highly contaminated), and for samples which fail the acceptance criteria for EIS compounds (see Appendix B, Tables 10-12). Other sample matrix characteristics which may require subsampling are described in Appendix G. When subsampling is required to manage high concentrations, no less than 250 µL of aqueous or leachate samples may be subsampled - if greater dilution is required, serial dilution must be employed. When subsampling is required to manage challenging matrices, no less than 1 mL of samples may be subsampled. For solid and tissue samples, no less than 10% of the target sample mass should be used for reduced-mass extractions, to help ensure the extracted mass is representative of the bulk sample. This means no less than 0.5 g for solids and no less than 0.2 g for tissues may be used for sample preparation.

Tissue sample homogenization will be performed in the Pace Green Bay facility, following SOP ENV-SOP-GBAY-0129 v05 *Sample Homogenization Compositing and Sub-Sampling*.

9.3.2 Determination of Percent Solids

Aqueous samples received with visually observable solids will be handled following the decision tree presented in Appendix G. No TSS pre-test will be performed on aqueous samples prior to preparation.

Percent solids analysis must be performed on all solid samples (excluding tissues) prior to preparation and analysis. All solid samples will be logged in for both 1633 and percent solids analysis. The percent solids analysis will follow the Method SM2540G protocol.

9.3.3 Aqueous Sample Processing

Per the parent method, this protocol is applicable to aqueous samples containing up to 100 mg/L solids per sample, and the procedure requires the preparation of the entire sample where possible. Smaller sample volumes may be analyzed for samples containing solids greater than specified for this method, or when unavoidable due to high levels of PFAS. The typical sample size is 500 mL; however, sample size may vary, depending on project requirements, applicable regulations, and sample characteristics. The sample is to be analyzed in its entirety and should not be filtered.

Leachate samples are analyzed using a 100 mL sample volume. Therefore, they must not be included in the same sample preparation batch as aqueous samples analyzed using 500 mL sample volumes. Otherwise, leachate samples are handled identically to all other aqueous samples.

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1) Visually inspect each sample and note any matrix characteristics which may pose challenges during SPE and require additional processing; see Appendix G for more information.

2) Weigh each sample bottle (with the lid) to the nearest 0.1 g. The volume of the aqueous sample analyzed is determined by weighing the full sample bottle and then the empty sample bottle after extraction is complete.

3) Prepare a method blank and two LCSs using PFAS-free water in HDPE bottles. Select a volume of water that is typical of the samples in the batch (i.e., 500 mL; 100 mL for leachate samples). Spike one LCS sample with native standard solution at 2x the LOQ (64 µL of STK-10X mix). This aliquot (LLLCS) will serve to verify the LOQ. Spike the other LCS sample at a concentration near the mid-level calibration point (40 µL of EPA-1633STK). This aliquot will serve as the traditional LCS.

Note: If matrix spikes are required for a specific project, spike the field sample bottles designated for use as MS/MSD samples in the same manner as the LCS.

4) Spike 20 µL of EIS solution (Section 8.2.3) directly into the sample in the original bottle (or subsampled bottle) as well as to the bottles prepared for the QC samples. Mix by capping and inverting the sample containers.

5) Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide (or with 5% formic acid and 3% aqueous ammonium hydroxide). The sample is now ready for solid phase extraction (SPE) and cleanup.

9.3.4 Solid Phase Extraction of Aqueous Samples

Note: Carbon cleanup is required. Carbon cleanup may remove analytes if the sample has a very low organic carbon content (this is unusual for non-drinking water environmental samples). This will be apparent if the isotope dilution standard recoveries are significantly higher on the reanalysis.

1) Pack clean silanized glass wool to half the height of a WAX SPE cartridge barrel; repeat for the total number of samples in the batch.

2) For each sample and QC aliquot, set up the vacuum manifold with one WAX SPE cartridge plus a reservoir adaptor and reservoir for each cartridge; label each reservoir with the associated sample ID. If using plastic transfer lines instead of reservoirs, ensure the connecting caps are snug in each cartridge and the transfer lines are placed within the appropriate sample; label each cartridge tube with the associated sample ID.

3) Pre-condition the cartridges by washing them with 15 mL of 1% methanolic ammonium hydroxide followed by 5 mL of 0.3M formic acid. Perform each rinse separately. Do not allow the WAX SPE to go dry. Discard the wash solvents.

4) Pour the sample into the reservoir (do not use a pipette), taking care to avoid splashing while loading; or, if using transfer lines, begin opening the stopcocks on the vacuum manifold. Adjust the vacuum/stopcocks to pass each sample through

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the cartridge at approximately 5-10 mL/min; discard the eluate. Retain the empty sample bottle for later rinsing (Section 9.3.5).

Note: In the event the SPE cartridge begins to clog during aqueous sample loading, abandon the loading step and attempt to rinse and dry the clogged cartridge, following the protocol below. The cartridge is then ready for elution. If the clogging prevents the rinse from passing through the cartridge, it will not be possible to collect an extract for the associated sample. See Appendix G for more information.

5) Rinse the walls of the reservoir with 5 mL reagent water twice, followed by 5 mL of 1:1 0.1M formic acid/methanol and pass those rinses through the cartridge using vacuum. If using sample transfer lines for loading, add the 3 rinses to the bottle and load through the transfer lines to the cartridge, one reagent at a time. Dry the cartridge by pulling air through for approximately 5 minutes. Discard the rinse solution.

6) After the WAX cartridges are sufficiently dry, rinse the GCB cartridges with 5 mL of 1% methanolic ammonium hydroxide; discard the rinsate. Do not allow the GCB to go completely dry.

7) Connect the outlet of the WAX cartridges to the inlet of the GCB cartridges to stack them on the manifold and allow for cleanup of the extract as part of elution. Ensure that the WAX cartridges are returned to their original locations on the manifold to avoid cross contamination. Continue to the elution steps in the next section.

9.3.5 Elution of Aqueous Sample Extracts

1) Place clean collection tubes inside the manifold, ensuring that the extract delivery tips do not touch the walls of the tubes. Resume vacuum and ensure a proper seal is achieved. DO NOT add NIS to these collection tubes.

2) Add 5 mL of 1% methanolic ammonium hydroxide to each empty sample bottle. Cap the bottle and rotate to ensure all internal surfaces of each bottle are rinsed; avoid vigorous shaking when rinsing the 500 mL aqueous sample bottles with only 5 mL of methanol – any evaporation/vaporization will contribute to loss of extract here. After rinsing the inside of the sample bottle, pour the rinse from the bottle or use a plastic transfer pipette to transfer the rinse to the SPE reservoir, using it to wash the walls of the reservoir. If using sample transfer lines, simply transfer this rinse from each sample container to its associated cartridge using vacuum. Allow the elution solvent to soak the SPE sorbent for 2 minutes before using vacuum to pull the elution solvent through the cartridge and into the collection tubes in a slow, dropwise manner.

3) Air dry the empty sample bottle after the rinse is transferred. Weigh the empty bottle with the cap on and subtract that from the weight of the bottle with sample, determined in Section 9.3.3, step 2.

4) Add 25 µL of concentrated acetic acid and 20 µL of NIS mix to each sample extract in its collection tube and vortex to mix. Transfer a portion of each extract into an autosampler vial for LC-MS/MS analysis. Cap the collection tubes containing the remaining extracts and store at 0 - 6 °C.

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9.3.6 Solid Sample (excluding tissues) Processing

Any solid sample received containing <50% solids (>50% moisture; >10 g target mass for 5 g dry weight) should be re-logged and prepared as a biosolid, using a target dry weight of 0.5 g. Any solid or biosolid sample received containing <5% solids (>95% moisture; >10 g target mass for 0.5 g dry weight) should be re-logged and prepared as a leachate sample, using no more than 100 mL of sample for extraction.

1) Mix the sample in its original jar. If it is impractical to mix the sample within its container, transfer the sample to a larger container. Mix the sample thoroughly, stirring from the bottom to the top and in a circular motion along the sides of the jar, breaking particles up by pressing against the side of the container. The homogenized sample should be even in color and have no separate layers. Store the homogenized material in its original container or in multiple smaller containers.

2) Determine the percent solids as per Section 9.3.2.

Note: The target sample weight for sediment or soil is 5 g dry weight. The target sample weight for biosolids is 0.5 g dry weight. Small amounts of reagent-free water used for method blanks (10% of sample weight or less) can be added to unusually dry samples. This is an option, not a requirement.

3) Check the LIMS system for the percent solids data associated with the samples to be prepared. Using the percent solids data and the calculation below, weigh out an aliquot of each solid sample, not dried, into a 50 mL polypropylene centrifuge tube. Sample mass should be within ±0.2 g of target mass for soil and sediment samples, and within ±0.02 g of target mass for biosolids samples. Sample aliquot should provide 5 g dry weight (Wi_{Dry} below) for soil and sediment or 0.5 g dry weight for biosolids. Because biosolid samples are analyzed with a 0.5 g sample mass, they must not be included in the same sample preparation batch as solid samples analyzed with 5 g sample masses. Any solid sample received containing <50% solids (>50% moisture; >10 g target mass for 5 g dry weight) should be re-logged and prepared as a biosolid, using a target dry weight of 0.5 g. Any solid or biosolid sample received containing <5% solids (>95% moisture; >10 g target mass for 0.5 g dry weight) should be re-logged and prepared as a leachate sample, using no more than 100 mL of sample for extraction.

$$Solid\ Sample\ Target\ Mass\ (g) = \frac{Wi_{Dry}\ (g)}{\%\ solids\ (decimal)}$$

4) Prepare batch QC samples using 5 g of reference solid wetted with 2.5 g of reagent water for the method blank and two LCSs (use 0.5 g of reference solid with 0.25 g of reagent water for biosolid extraction batches). The addition of reagent water to the sand provides a matrix closer in composition to real-world samples. Spike one LCS sample with native standard solution at 2x the LOQ (80 µL of STK-10X mix). This aliquot (LLLCS) will serve to verify the LOQ. Spike the other LCS sample at a concentration near the mid-level calibration point (40 µL of EPA-1633STK). This aliquot will serve as the traditional LCS.

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Note: If matrix spikes are required for a specific project, spike the field sample bottles designated for use as MS/MSD samples in the same manner as the LCS.

5) Spike 20 µL of EIS solution (Section 8.2.3) directly into each centrifuge tube containing the aliquoted field and QC samples. Vortex or shake the sample to disperse the standard and allow to equilibrate for approximately 30 minutes.

6) Add 15 mL of 0.3% methanolic ammonium hydroxide to each centrifuge tube. Vortex to disperse, then shake for 30 minutes on a variable speed mixing table. Centrifuge at 3000 rpm (~2000 RCF) for 10 minutes and transfer the supernatant to a clean, labeled 50 mL polypropylene centrifuge tube.

7) Add 15 mL of 0.3% methanolic ammonium hydroxide to the remaining solid sample in each centrifuge tube. Vortex to disperse, then shake for 30 minutes on a variable speed mixing table. Centrifuge at 3000 rpm (~2000 RCF) for 10 minutes and decant the supernatant from the second extraction into the centrifuge tube with the supernatant from the first extraction.

8) Dilute to approximately 40 mL with reagent water. A separate centrifuge tube marked at the 40 mL level may be kept for a visual reference to get the approximate volume. Samples containing excess water may yield extracts that are greater than 40 mL in volume; therefore, do not add water to these.

9) Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide (or with 5% formic acid and 3% aqueous ammonium hydroxide). The extract is now ready for solid phase extraction (SPE) and cleanup.

9.3.7 Solid Phase Extraction of Solid Samples

1) Pack clean silanized glass wool to half the height of a WAX SPE cartridge barrel; repeat for the total number of samples in the batch.

2) For each sample and QC aliquot, set up the vacuum manifold with one WAX SPE cartridge plus a reservoir adaptor and reservoir for each cartridge; label each reservoir with the associated sample ID. If using plastic transfer lines instead of reservoirs, ensure the connecting caps are snug in each cartridge and the transfer lines are placed within the appropriate sample; label each cartridge tube with the associated sample ID.

3) Pre-condition the cartridges by washing them with 15 mL of 1% methanolic ammonium hydroxide followed by 5 mL of 0.3M formic acid. Perform each rinse separately. Do not allow the WAX SPE to go dry. Discard the wash solvents.

4) Pour the sample into the reservoir (do not use a pipette), taking care to avoid splashing while loading; or, if using transfer lines, begin opening the stopcocks on the vacuum manifold. Adjust the vacuum/stopcocks to pass each sample through the cartridge at approximately 5-10 mL/min; discard the eluate. Retain the empty sample bottle for later rinsing (Section 9.3.8).

5) Rinse the walls of the reservoir with 5 mL reagent water twice, followed by 5 mL of 1:1 0.1M formic acid/methanol and pass those rinses through the cartridge using

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vacuum. If using sample transfer lines for loading, add the 3 rinses to the bottle and load through the transfer lines to the cartridge, one reagent at a time. Dry the cartridge by pulling air through for approximately 5 minutes. Discard the rinse solution.

6) After the WAX cartridges are sufficiently dry, rinse the GCB cartridges with 5 mL of 1% methanolic ammonium hydroxide; discard the rinsate. Do not allow the GCB to go completely dry.

7) Connect the outlet of the WAX cartridges to the inlet of the GCB cartridges to stack them on the manifold and allow for cleanup of the extract as part of elution. Ensure that the WAX cartridges are returned to their original locations on the manifold to avoid cross contamination. Continue to the elution steps in the next section.

9.3.8 Elution of Solid Sample Extracts

1) Place a clean collection tube in the manifold rack for each sample and QC aliquot, ensuring the extract delivery needles are not touching the walls of the tubes. Resume vacuum and ensure a proper seal is achieved. DO NOT add NIS to these collection tubes.

2) Rinse the inside of each sample's centrifuge tube using 5 mL of 1% methanolic ammonium hydroxide. Then pour the rinse from each bottle (or use a plastic transfer pipette) to transfer the rinse to the associated SPE reservoir, washing the walls of the reservoir. If using sample transfer lines, simply transfer this rinse from each sample container to its associated cartridge using vacuum. Allow the elution solvent to soak the SPE sorbent for 2 minutes, then use vacuum to pull the elution solvent through the cartridge and into the collection tubes in a slow, dropwise manner.

3) Add 25 µL of concentrated acetic acid and 20 µL of NIS mix to each sample extract in its collection tube and vortex to mix. Transfer a portion of each extract into an autosampler vial for LC-MS/MS analysis. Cap the collection tubes containing the remaining extracts and store at 0 - 6 °C.

9.3.9 Tissue Sample Processing

Prior to processing tissue samples, the laboratory must determine the exact tissue to be analyzed. Common requests for analysis of fish tissue include whole fish with the skin on, whole fish with the skin removed, edible fish fillets (filleted in the field or by the laboratory), specific organs, and other portions. Once the appropriate tissue has been determined, the samples must be prepared and homogenized.

Pace utilizes the Green Bay location for tissue homogenization, following ENV-SOP-GBAY-0129 (Sample Homogenization, Compositing, and Subsampling; specifically, Section 9.4).

1) For each sample, weigh a 2 g aliquot of homogenized tissue into a 50 mL polypropylene centrifuge tube. Reseal the container with the remaining homogenized portion of the sample and return it to frozen storage in case it needs to be used for reanalysis. The default sample weight for tissue is 2 g wet weight; however, a 1 g sample may be used. Higher sample weights are not recommended for this method.

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2) Prepare the batch QC samples using 2 g of reference tissue matrix for the method blank and two LCSs. Spike one LCS sample with native standard solutions at 2x the LOQ (80 µL of STK-10X mix). This aliquot (LLLCS) will serve to verify the LOQ. Spike the other LCS sample at a concentration near the mid-level calibration point (40 µL of EPA1633-STK). This aliquot will serve as the traditional LCS.

Note: If matrix spikes are required for a specific project, spike the field sample bottles designated for use as MS/MSD samples in the same manner as the LCS.

3) Spike 20 µL of EIS solution (Section 8.2.3) directly into each field and QC sample. Vortex and allow to equilibrate for approximately 30 minutes.

4) Add 15 mL of 0.05M KOH in methanol to each sample. Vortex to disperse the tissue then place tubes on a variable speed mixing table to shake for 1 hour. Centrifuge at 3000 rpm (~2000 RCF) for 10 minutes and collect the supernatant in a 125mL sample bottle.

5) Add 10 mL of acetonitrile to remaining tissue in the centrifuge tube, vortex to mix and disperse the tissue. Sonicate for 30 minutes. Centrifuge at 3000 rpm (~2000 RCF) for 10 minutes and collect the supernatant, adding it to the 125mL bottle containing the initial extract.

6) Dilute to approximately 75 mL with reagent water. A separate bottle marked at the 75 mL level may be used to get the approximate volume.

7) Check that the pH is 6.5 ± 0.5. If necessary, adjust pH with 50% formic acid or ammonium hydroxide (or with 5% formic acid and 3% aqueous ammonium hydroxide). The extract is now ready for solid phase extraction (SPE) and cleanup.

9.3.10 Solid Phase Extraction of Tissue Samples

1) Pack clean silanized glass wool to half the height of a WAX SPE cartridge barrel; repeat for the total number of samples in the batch.

2) For each sample and QC aliquot, set up the vacuum manifold with one WAX SPE cartridge plus a reservoir adaptor and reservoir for each cartridge; label each reservoir with the associated sample ID. If using plastic transfer lines instead of reservoirs, ensure the connecting caps are snug in each cartridge and the transfer lines are placed within the appropriate sample; label each cartridge tube with the associated sample ID.

3) Pre-condition the cartridges by washing them with 15 mL of 1% methanolic ammonium hydroxide followed by 5 mL of 0.3M formic acid. Perform each rinse separately. Do not allow the WAX SPE to go dry. Discard the wash solvents.

4) Pour the sample into the reservoir (do not use a pipette), taking care to avoid splashing while loading; or, if using transfer lines, begin opening the stopcocks on the vacuum manifold. Adjust the vacuum/stopcocks to pass each sample through the cartridge at approximately 5-10 mL/min; discard the eluate. Retain the empty sample bottle for later rinsing (Section 9.3.8).

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5) Rinse the walls of the reservoir with 5 mL reagent water twice, followed by 5 mL of 1:1 0.1M formic acid/methanol and pass those rinses through the cartridge using vacuum. If using sample transfer lines for loading, add the 3 rinses to the bottle and load through the transfer lines to the cartridge, one reagent at a time. Dry the cartridge by pulling air through for approximately 5 minutes. Discard the rinse solution.

6) After the WAX cartridges are sufficiently dry, rinse the GCB cartridges with 5 mL of 1% methanolic ammonium hydroxide; discard the rinsate. Do not allow the GCB to go completely dry.

7) Connect the outlet of the WAX cartridges to the inlet of the GCB cartridges to stack them on the manifold and allow for cleanup of the extract as part of elution. Ensure that the WAX cartridges are returned to their original locations on the manifold to avoid cross contamination. Continue to the elution steps in the next section.

9.3.11 Elution of Tissue Sample Extracts

1) Place a clean collection tube in the manifold rack for each sample and QC aliquot, ensuring the extract delivery needles are not touching the walls of the tubes. Resume vacuum and ensure a proper seal is achieved. DO NOT add NIS to these collection tubes.

2) Rinse the inside of each sample's centrifuge tube using 5 mL of 1% methanolic ammonium hydroxide. Then pour the rinse from each bottle (or use a plastic transfer pipette) to transfer the rinse to the associated SPE reservoir, washing the walls of the reservoir. If using sample transfer lines, simply transfer this rinse from each sample container to its associated cartridge using vacuum. Allow the elution solvent to soak the SPE sorbent for 2 minutes, then use vacuum to pull the elution solvent through the cartridge and into the collection tubes in a slow, dropwise manner.

3) Add 25 µL of concentrated acetic acid and 20 µL of NIS mix to each sample extract in its collection tube and vortex to mix. Transfer a portion of each extract into an autosampler vial for LC-MS/MS analysis. Cap the collection tubes containing the remaining extracts and store at 0 - 6 °C.

9.4 Analysis

9.4.1 Sequence Preparation

Analysis of sample extracts for PFAS by LC-MS/MS is performed running manufacturer's data acquisition software. The mass spectrometer is run with unit mass resolution in the multiple reaction monitoring (MRM) mode.

1) Perform mass calibration and mass calibration verification, establish the operating conditions, and perform an initial calibration prior to analyzing samples. Only after all performance criteria are met may blanks, MDLs, IDOC/LCS, and samples be analyzed.

2) Each day of analysis, the column must be thoroughly flushed with 100% Acetonitrile for at least 30 minutes to clear any accumulated impurities and interferences from the sample pathway and equilibrate the system. It is also good practice to open the purge valve(s) on the pumps for the first ~1 minute of flush time and/or use the "purge"

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function available as part of the pump functionality. Additionally, it is good practice to purge the autosampler injector flow path daily prior to analysis by using the "purge" function, if available. The column should then be equilibrated to the analysis starting conditions by flushing for approximately 15 mins with 50:50 Mobile Phase A: Mobile Phase B and finally approximately 15 mins with 80:20 Mobile Phase A: Mobile Phase B (acquisition starting conditions). Ensure that system pressure is stable.

3) Following any initial priming injections on days when a calibration is not needed, an ISC and an instrument blank will be analyzed to demonstrate system suitability and the absence of system contamination prior to sample analysis.

4) After acceptable ISC and IBLK results are confirmed, load and submit extracted samples for analysis, typically starting with batch QC with field samples following. A CCV and CCB must be analyzed after every 10 (or fewer) field samples.

9.4.2 Routine Analytical Sequence

After a successful initial calibration has been completed, samples may be analyzed; an example analytical sequence is provided below. The volume injected for samples and QCs must be identical to the volume used for calibration. Standards and sample extracts must be brought to room temperature and vortexed prior to aliquoting into an instrument vial to ensure homogeneity of the extract.

- ISC
- CCV
- Instrument Blank
- Method Blank
- LLLCS
- LCS
- Samples (10 or fewer)
- CCV
- CCB
- Samples (10 or fewer)
- CCV

If the results are acceptable, the closing CCV analysis may be used as the opening solution for the next analytical sequence.

If the response exceeds the calibration range for any sample, extracts are diluted as per Section 9.4.3 to bring all target responses within the calibration range.

Note: If the analytes that exceed the calibration range in the original analysis are known to not be of concern for the specific project (e.g., are not listed in a discharge permit), then the laboratory may consult with the client regarding the possibility of reporting that sample from the undiluted analysis.

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9.4.3 Sample Dilutions

If the measured concentration for any compound exceeds the calibration range of the system, dilute an aliquot of the sample extract with the IBLK mix solution by a factor no greater than 10x, refortify the NIS compounds to initial concentration, and analyze the diluted extract. If the responses for each applicable EIS in the diluted extract meet the S/N and retention time requirements in Section 10.1.1, and the EIS recoveries from the analysis of the diluted extract, corrected for the dilution, are within the limits presented in Table 10, 11 or 12 (according to sample matrix), then the compounds associated with those EISs may be quantified. The EIS recoveries, compound concentrations, detection limits, and LOQs are adjusted to account for the dilution.

If the EIS responses in the diluted extract do not meet the S/N and retention time requirements listed in Section 10.1.1, then the compound cannot be measured reliably in the diluted extract. In such cases, subsample a smaller aliquot of any affected aqueous sample and dilute it to 500 mL with reagent water and re-extract the sample. For solid sample matrices, prepare a smaller aliquot of soil, biosolid, sediment, or tissue and re-extract the sample. The reduced sample volume (or mass) chosen for the re-extraction should reflect the dilution applied to the original extract (i.e., if the original aqueous sample extract was analyzed at a 10X dilution, 50 mL should be subsampled for the re-extraction). See Section 9.3.1 for more guidance. The reported compound concentrations, detection limits, and LOQs are adjusted to account for the reduced sample volume (or mass) that is extracted.

If the recovery of any isotopically labeled compound is outside of the acceptance limits (Appendix B) in the original, undiluted analysis, a diluted aqueous sample or smaller aliquot (for solids and tissue) should be prepared and analyzed.

10.0 Data Analysis & Calculations

10.1 Data Analysis

10.1.1 Qualitative Identification

A native, EIS, or NIS compound is positively identified in a standard, blank, sample, or QC sample when all criteria in Sections 10.1.1.1 through 10.1.1.3 are met.

10.1.1.1 Signal-to-Noise Ratio (S/N)

Peak responses of the quantitation and confirmation ions must be at least three times the background noise level (S/N 3:1). The quantitation ion must have a S/N ≥ 10:1 if there is no confirmation ion. If the S/N ratio is not met in a standard or QC sample due to high background noise, the laboratory must correct the issue (e.g., perform instrument troubleshooting). If the S/N ratio is not met in a blank or sample, then the analyte is to be considered a non-detect.

10.1.1.2 RT Criteria

Target analyte, EIS analyte, and NIS analyte RTs must fall within 0.4 minutes of the predicted retention times from the midpoint standard of the ICAL or initial daily CCV, whichever was used to establish the RT window position for the

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analytical batch. The retention time window used must be of sufficient width to detect earlier-eluting branched isomers. For all method analytes with exact corresponding isotopically labeled analogs, method analytes must elute within 0.1 minutes of the associated EIS.

10.1.1.3 Ion Ratio Criteria

For any reported compound detection, the ratio of the total (branched and linear isomer) quantification ion response to the total (branched and linear isomer) confirmation ion response – referred to as the Ion Ratio – must fall within ± 50% of the ratio observed in the mid-point ICAL standard. The ion ratio requirement does not apply for PFBA, PFPeA, NMeFOSE, NEtFOSE, PFMPA, and PFMBA because suitable secondary transitions are unavailable (not detectable or inadequate S/N).

10.1.2 Manual Integration

Manual integration is sometimes necessary to correct inaccurate automated integrations but must never be used to meet QC criteria or to substitute for proper instrument maintenance and/or method set-up. To assure that all manual integrations are justified and proper all manual integrations must be performed, documented, reviewed, and approved in accordance with corporate SOP ENV-SOP-CORQ-0006, *Manual Integration*. Refer to this SOP for guidance on manual integration techniques and required procedures.

10.1.2.1 Branched Isomer Integration

The response of all isomers in the quantitative standards should be used to define integration parameters and ion ratios. In samples, the total integrated response should include the branched isomer peaks that have been identified in the quantitative standard, if present. For compounds with identified branched and linear isomer peaks, the reported concentration is the sum of all isomers. If standards (either quantitative or qualitative) containing a mix of isomers are not available for purchase for a particular compound, only the linear isomer can be identified and quantitated in samples.

10.1.2.2 Qualification

If the field sample result does not meet all criteria stated in Section 10.1.1, and all sample preparation avenues (e.g., extract cleanup, sample dilution, etc.) have been exhausted, the result may only be reported with a data qualifier alerting the data user that the result could not be confirmed because it did not meet the method-required criteria and therefore should be considered an estimated value. If the criteria listed above are not met for the standards, the laboratory must stop analysis of samples and correct the issue.

10.2 Calculations

Refer to laboratory SOP (ENV-SOP-WEST-0124, Common Laboratory Calculations), or however named, for equations used to perform common calculations.

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10.2.1 ICAL Relative Response (RR) and Response Factor (RF)

The response ratio (RR) for each native compound calibrated by isotope dilution is calculated according to the equation below, separately for each of the calibration standards, using the areas of the quantification ions shown in Table 4. RR is used for the 24 compounds measured by true isotope dilution quantification.

$$RR = \frac{Area_t M_{EIS}}{Area_{EIS} M_t}$$

Where:

$Area_t$ = Measured area of the quantitation ion for the target analyte.

$Area_{EIS}$ = Measured area of the quantitation ion for the corresponding labeled PFAS used as the EIS in the calibration standards.

M_{EIS} = Concentration of the isotopically labeled PFAS uses as the EIS in the calibration standards (ng/L)

M_t = Concentration of the target analyte in the calibration standard (ng/L)

Similarly, the response factor (RF) for each native compound calibrated by extracted internal standard is calculated according to the equation below. RF is used for the 16 compounds measured by extracted internal standard quantification.

$$RF = \frac{Area_t M_{EIS}}{Area_{EIS} M_t}$$

Where:

$Area_t$ = Measured area of the quantitation ion for the target analyte.

$Area_{EIS}$ = Measured area of the quantitation ion for the corresponding labeled PFAS used as the EIS in the calibration standards.

M_{EIS} = Concentration of the isotopically labeled PFAS uses as the EIS in the calibration standards (ng/L)

M_t = Concentration of the target analyte in the calibration standard (ng/L)

A response factor (RF_S) is calculated for each EIS compound in the calibration standard using the equation below. RF_S is used for the 24 isotopically labeled compounds measured by non-extracted internal standard quantification.

$$RF_S = \frac{Area_{EIS} M_{NIS}}{Area_{NIS} M_{EIS}}$$

Where:

$Area_{EIS}$ = Measured area of the quantitation ion for the EIS compound added to the sample before extraction.

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$Area_{NIS}$ = Measured area of the quantitation ion for the NIS compound in the calibration standard.

M_{NIS} = Concentration of the NIS compound in the calibration standard (ng/L).

M_{EIS} = Concentration of the EIS compound in the calibration standard (ng/L).

10.2.2 Target Analyte Concentration

Concentrations of the target analytes are determined with respect to the extracted internal standard (EIS) which is added to the sample prior to extraction (see Table 4). Other equations may be used if the laboratory demonstrates that those equations produce the same numerical result as produced by the equation below.

$$Concentration\ (ng/L or ng/g) = \frac{Area_N M_{EIS}}{Area_{EIS}(\overline{RR}\ or\ \overline{RF})}\ x\ DF\ x\ \frac{Vf}{Vi}$$

Where:

$Area_N$ = The measured area of the quantitation ion for the native (unlabeled) PFAS.

$Area_{EIS}$ = The measured area of the quantitation ion for the EIS.

M_{EIS} = The expected concentration of the EIS in the extract (ng/L)

$\overline{RR}$ = Average response ratio used to quantify target compounds by the isotope dilution method.

$\overline{RF}$ = Average response ratio used to quantify target compounds by the extracted internal standard method.

DF = Dilution Factor. If no extract dilution was performed, then DF=1.

Vf = Final extract volume (L)

Vi = Initial sample volume (L) or weight (g)

10.2.3 EIS Concentration

The EIS compounds are quantitated with respect to an NIS, as shown in Table 4, using the response ratios or response factors from the most recent initial calibration. Other equations may be used if the laboratory demonstrates that those equations produce the same numerical result as produced by the equation below.

$$Concentration\ (ng/L\ or\ ng/g) = \frac{Area_{EIS} M_{NIS}}{Area_{NIS}\overline{RF_S}}\ x\ DF\ x\ \frac{Vf}{Vi}$$

Where:

$Area_{EIS}$ = The measured area of the quantitation ion for the EIS.

$Area_{NIS}$ = The measured area of the quantitation ion for the associated NIS.

M_{NIS} = The expected concentration of the NIS in the extract (ng/L)

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$\overline{RF_S}$ = Average response factor used to quantify the EIS compound by the non-extracted internal standard method.

DF = Dilution Factor. If no extract dilution was performed, then DF=1.

Vf = Final extract volume (L)

Vi = Initial sample volume (L) or weight (g)

10.2.4 Relative Error (%RE)

$$\%\ Relative\ Error = \left(\frac{x'i - xi}{xi}\right) x\ 100$$

Where:

xi = True value of the calibration standard

x'i = Measured concentration of the calibration standard

10.2.5 Percent Relative Standard Deviation

$$\%\ Relative\ Standard\ Deviation = \left(\frac{S}{\bar{x}}\right) x\ 100$$

Where:

S = Standard Deviation

X = Mean

10.2.6 Standard Deviation

$$S = \left(\frac{\sum (x_i - \bar{x})^2}{(n-1)}\right)$$

Where:

S = standard deviation

n = size of the population

x_i = each value of the population

$\bar{x}$ = population mean

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10.2.7 Mean

$$\bar{x} = \frac{\left(\sum_{i=1}^{n} x_i\right)}{n}$$

Where:

$\bar{x}$ = population mean

x_i = each value of the population

n = number of values in the population

10.3 Reporting

All results for aqueous samples will be reported in ng/L. All results for solid samples will be reported in ng/g, on a dry-weight basis, and the percent solids for each sample will be reported separately. All results for tissue samples will be reported in ng/g, on a wet-weight basis. All QC data will be reported with the sample results. See Appendix A for specific reporting limits in all matrices.

Unless specified otherwise by a regulatory authority or in a discharge permit, results for analytes that meet the identification criteria are reported down to the concentration of the LOQ established by the laboratory.

Results for any analyte found in a sample or extract that has been diluted will be reported at the least dilute level for which the measured concentration is within the calibration range (e.g., above the LOQ for the analyte and below the highest calibration standard) and in which isotopically labeled compound recoveries are within their respective QC acceptance criteria. This may require reporting results for some analytes from different analyses.

Recoveries of all associated EIS compounds will be reported for all field samples and QC Quality Control & Method Performance

10.4 Quality Control

Prepare and analyze the following QC samples with each batch of samples. Refer to Appendix B for acceptance criteria and required corrective action(s).

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QC Check	Acronym	Frequency
Method Blank	MB	1 per batch of 20 or fewer samples.
Laboratory Control Sample	LCS	1 per batch of 20 or fewer samples.
Low Level Laboratory Control Sample	LLLCS	1 per batch of 20 or fewer samples.
Matrix Spike	MS	1 pair per batch of 20 or fewer samples (if required/requested)
MS Duplicate	MSD	
Sample Duplicate	DUP	1 per AFFF or F3 sample.
Extracted Internal Standard	EIS	All CAL standards, batch QC and field samples.
Non-extracted Internal Standard	NIS	All CAL standards, batch QC and field samples.

The minimum quality control requirements of this method consist of an initial demonstration of laboratory capability, analysis of samples spiked with isotopically labeled compounds to evaluate and document data quality, and analysis of standards and blanks as tests of continued performance. Laboratory performance is compared to established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

If the method is to be applied to a sample matrix other than water (e.g., soils, biosolids, tissue), the appropriate alternative reference matrix is substituted for the reagent water matrix in all performance tests.

The laboratory must make an initial demonstration of the ability to generate acceptable precision and recovery with this method. This demonstration is described in Section 11.3.2.

Analyses of method blanks (MBs) are required on an on-going basis to demonstrate the extent of background contamination in any reagents or equipment used to prepare and analyze field samples. The procedures and criteria for analyses of MBs are described in Section 11.1.1.

The laboratory must spike all samples with isotopically labeled compounds to monitor method performance. These evaluations are described in Sections 11.1.4 and 11.1.5. When results of these spikes indicate atypical method performance for samples, the samples are diluted to evaluate whether the performance issue is caused by the sample matrix. Procedures for dilution are given in Section 9.4.3.

The laboratory must, on an ongoing basis, demonstrate that the analytical system is in control through calibration verification (CCV) and the analysis of blanks and ongoing precision and recovery standards spiked at low (LLLCS) and mid-level concentrations (LCS). These procedures are given in Sections 9.2.4.5, 11.1.1 and 11.1.2.

10.4.1 Method Blank (MB)

A method blank is analyzed with each extraction batch to demonstrate freedom from contamination. The matrix for the method blank must be similar to the sample matrix for the batch (e.g., reagent water blank, solids matrix blank, or tissue blank [Section 7.3]).

Analyze the extract of the method blank aliquot before the analysis of the LCSs.

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If any PFAS is found in the MB 1) at a concentration greater than the LOQ for the analyte, 2) at a concentration greater than one-third the regulatory compliance limit, or 3) at a concentration greater than one-tenth the concentration in a sample in the extraction batch, whichever is greatest, analysis of samples must be halted, and the problem corrected. Other project-specific requirements may apply; therefore, the laboratory may adopt more stringent acceptance limits for the method blank at their discretion. If the contamination is traceable to the extraction batch, samples affected by the blank must be re-extracted and analyzed along with a new MB and LCS/LLLCS, provided enough sample volume is available and the samples are still within holding time. Reanalysis or re-extraction is not required if the samples are not impacted. Samples are not impacted when the MB detection is not present in the sample, or the sample concentration is ≥10x the concentration of the detection in the MB.

If the new blank also exhibits contamination and additional volume of the associated sample(s) is not available for re-extraction and analysis, the laboratory must document and report the failures (e.g., as qualifiers on results), unless the failures are not required to be reported as determined by the regulatory/control authority.

10.4.2 Laboratory Control Sample (LCS) / Low-Level LCS (LLLCS)

Analyze the extract of the LCS and LLLCS to ensure the analytical process is under control.

Compute the percent recovery of the native compounds by the appropriate quantification method depending on the compound. Compute the percent recovery of each isotopically labeled compound by the non-extracted internal standard quantitation method.

For the target analytes and EIS compounds, compare the recovery to the LCS and LLLCS limits given in Tables 7 through 10 (or 12). LCS, LLLCS, and EIS results must meet the acceptance criteria in these tables. If all compounds meet the acceptance criteria, system performance is acceptable, and analysis of blanks and aqueous samples may proceed. If, however, any individual concentration falls outside of the given range, the extraction/concentration processes are not being performed properly for that compound. In this event correct the problem, re-extract all affected samples, including any QC samples, and repeat the analysis. Samples are unaffected if the LCS or LLLCS recovery is above the acceptance criteria and the sample is ND for the failing compound.

10.4.3 Matrix Spike (MS)

Matrix spikes generally are not required for methods that employ isotope dilution quantification because deleterious effects of the matrix should be evident in the recoveries of the EIS compounds spiked into every sample. The analysis of matrix spike samples may help diagnose the potential impact of matrix interferences for specific target analytes or sample matrices. See Appendix E for MS/MSD, MS/DUP sample selection guidance.

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10.4.4 Extracted Internal Standard (EIS)

To assess method performance on the sample matrix, the laboratory must spike all samples with the EIS solution. Analyze each sample according to the procedures in this SOP. Compute the percent recovery of the EIS compound concentration using the NIS quantitation method and the equation in Section 10.2.3.

The recovery of each EIS compound in an aqueous sample must be within the limits in Table 10, which are the required QC acceptance limits for aqueous samples, including landfill leachates. The recovery of each EIS compound in soil, sediment, or biosolid samples must be within the limits in Table 11. The recovery of each EIS compound in tissue samples must be within the limits in Table 12. The limits presented in Tables 10, 11, and 12 are the required QC acceptance limits for these matrices derived from the multi-laboratory validation study. If the recovery of any EIS falls outside of these limits, method performance is unacceptable for that EIS in that sample. Additional cleanup procedures or limited dilution of the sample extract may be employed to attempt to bring the EIS recovery within the acceptance normal range.

If the recovery cannot be brought within the acceptance limits after extract dilution or additional cleanup procedures have been employed, then the laboratory must take a smaller aliquot of any affected aqueous sample, dilute it to 500 mL with reagent water and prepare and analyze the diluted sample, or must prepare and analyze a smaller aliquot of soil, sediment, biosolid, or tissue sample, per Section 9.4.3.

10.4.5 Non-extracted Internal Standard (NIS)

To assess method performance, the laboratory must spike all sample extracts with the NIS solution. Analyze each sample extract according to the procedures in this SOP. Percent recovery of the NIS compound is calculated by comparing the measured response in each analysis to the average response of the same compound measured in the ICAL.

Calculate the ratio of the NIS peak areas from the QC and field samples relative to the mean area of the corresponding NIS in the most recent initial calibration to check for possible bad injections of NIS solution or loss of instrument sensitivity.

The NIS areas in the field samples and QC samples must be within 50 to 200% of the mean area of the corresponding NIS in the most recent initial calibration (i.e., within a factor of 2). If the areas are low for all the field samples and QC samples in the batch, it suggests a loss of instrument sensitivity, while low areas in only some field or QC samples suggests a possible bad injection.

10.5 Instrument QC

Perform the following checks to verify instrument performance. Refer to Appendix B for acceptance criteria and required corrective action.

Instrument Check	Acronym	Frequency
Mass Calibration		Annually and on as-needed basis
Mass Calibration Verification		After mass calibration

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Instrument Check	Acronym	Frequency
Initial Calibration	ICAL	Prior to analysis, and on as-needed basis
Initial Calibration Verification	ICV	Following each ICAL
Instrument Blank	IBLK/ICB	Daily prior to analysis and after high standards
Instrument Sensitivity Check	ISC	Daily prior to analysis
Continuing Calibration Verification	CCV	At the beginning (ISC) and every 10 samples
Continuing Calibration Blank	CCB	After each bracketing CCV
RT Window	RTW	During ICAL and at the beginning of each analytical sequence

10.6 Method Performance

10.6.1 Method Validation

Refer to corporate SOP ENV-SOP-CORQ-0011, *Method Validation and Instrument Verification*, for general requirements and procedures for method validation.

Establish Detection Limit (DL) and limits of quantitation (LOQ) at initial method set up and verify the DL and LOQ on an on-going basis thereafter. Refer to corporate policy and/or SOP for DL and LOQ requirements and procedures.

10.6.2 Demonstration of Capability (DOC)

Refer to laboratory SOP ENV-SOP-WEST-0122 Demonstration of Capability, or however named, for information regarding the laboratory's procedures for initial and ongoing Demonstration of Capability.

Prior to unsupervised (independent) work on any client sample, analysts that prepare or analyze samples must have successful initial demonstration of capability (IDOC) and must successfully demonstrate on-going proficiency on an annual basis (see below for details). Successful means the initial or on-going DOC met criteria, documentation of the DOC is complete, and the DOC record is in the employee's training file.

Each DOC requires the extraction and analysis of four aliquots of the reference matrix type to be tested, prepared in the same way as the mid-level LCS. At least one method blank, matching the matrix being analyzed, must be prepared with the DOC batch. If more than one MB was prepared and analyzed with the DOC batch, all blank results must be reported. All sample processing steps that are to be used for processing samples, including preparation and extraction, must be included in this test.

Using the results of the four analyses, compute the average percent recovery (%REC) and the relative standard deviation (RSD) of the concentration of each target compound. There are no mean or RSD criteria for EIS compounds in the DOC; %REC of each DOC sample should meet the criteria in Appendix B, Tables 10, 11, or 12, depending on the matrix.

For each target compound, compare RSD and %REC to the corresponding limits for initial precision and recovery in Appendix B, Tables 7, 8, or 9, depending on the matrix.

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If RSD and %REC for all compounds meet the acceptance criteria, system performance is acceptable, and analysis of blanks and samples may begin. If, however, any individual RSD exceeds the precision limit or any individual %REC falls outside the range for recovery, system performance is unacceptable for that compound. Correct the problem and repeat the test.

11.0 Data Review & Corrective Action

11.1 Data Review

The data review process of Pace® Analytical Services includes a series of checks performed at different stages of the process by different people to ensure that SOPs were followed, the analytical record is complete and properly documented, QC criteria were met, proper corrective actions were taken for QC failure and other nonconformance(s), and test results are reported with proper qualification, when necessary.

The review and checks that are performed by the employee performing the task is called primary review.

All data and test results are also peer reviewed. This process, known as secondary review, is performed to verify SOPs were followed, that calibration, instrument performance, and QC criteria were met and/or proper corrective actions were taken, qualitative ID and quantitative measurement is accurate, all manual integrations are justified, documented, and approved in accordance with the Pace® Analytical Services SOP for manual integration, calculations are correct, the analytical record is complete and traceable, and that results are properly qualified.

Lastly, a third-level review, called a completeness check, is performed by reporting or project management staff to verify the test report is complete.

Refer to laboratory SWI ENV-SWI-WEST-0087 SVOA Data Review Work Instructions for specific instructions and requirements for each step of the data review process.

11.2 Corrective Action

Corrective action is required when QC or sample results are not within acceptance criteria.

Refer to Appendix B for a complete summary of QC, acceptance criteria, and recommended corrective actions for QC associated with this test method.

If corrective action is not taken or was not successful, the decision/outcome must be documented in the analytical record. The primary analyst has primary responsibility for taking corrective action when QA/QC criteria are not met. Secondary data reviewers must verify that appropriate action was taken and/or that results reported with QC failure are properly qualified.

Corrective action is also required when carryover is suspected and when results are over range. Samples analyzed after a high concentration sample must be checked for carryover and reanalyzed if carryover is suspected. Carryover is usually indicated by low concentration detects of the analyte in successive samples analyzed after the high concentration sample.

Sample results at concentrations above the upper limit of quantitation must be diluted and reanalyzed. The result in the diluted samples should be within the working concentration range

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of the instrument calibration. If dilution is not performed, any result reported above the upper range is considered a qualitative measurement and must be qualified as an estimated value.

12.0 Pollution Prevention & Waste Management

Refer to laboratory guide ENV-GUI-WEST-0020 Hazardous Waste Management and Disposal, or however named, for waste handling and management practices pertaining to the waste streams created at this facility.

Pace® proactively seeks ways to minimize waste generated during work processes. Some examples of pollution prevention include but are not limited to reduced solvent extraction, solvent capture, use of reusable cycletainers for solvent management, and real-time purchasing.

The EPA requires that laboratory waste management practices comply with all applicable federal and state laws and regulations. Excess reagents, samples, and method process wastes are characterized and disposed of in an acceptable manner in accordance with the Pace® Chemical Hygiene Plan / Safety Manual. Refer to this manual for these procedures.

13.0 Modifications

The procedures in this SOP have been modified from the reference test method as follows:

Modification	Section of Reference Method Modified	Justification for Modification	Validation of Modification
Updated EIS quantitation matching for select compounds (PFMPA, 7:3FTCA, ADONA, 9Cl-PF3ONS, 11Cl-PF3OUdS)	Section 20, Table 10	Improved performance, more appropriate correlation	MDL, IDOC, PT
Updated product ion used for measurement of 13C4-PFOA from m/z 172 to m/z 372	Section 20, Table 10	Match ion transition used for EIS 13C8-PFOA and native PFOA	MDL, IDOC, PT
Increased SPE sorbent bed to 250mg, tube size to 20mL	Section 6.7.1	Wider cartridge improves sample loading, reduces chances of clogs	MDL, IDOC, PT
Increased allowable sample loading rate to 5-10 mL/min	Section 12.1.4	Reduced Sample processing time	MDL, IDOC, PT
Omit TSS for aqueous samples	Section 11.1 (11.1.1.5), 11.2.4	Reduced sample processing time	MDL, IDOC, PT
Solid matrix extraction: reduced liquid-solid shake/decant steps to 2; omitted concentration step	Section 11.3 (11.3.4, 11.3.6, 11.3.9)	Improved performance & reduced sample processing time	MDL, IDOC, PT
GCB cartridges: eliminated dGCB + syringe filtration	Section 11.3.7, 11.4.7, 12.1, 12.2.3, 12.2.4, 12.3.3, 12.4.3	Improved performance, reduced sample processing time, & ease of use	MDL, IDOC, PT

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Modification	Section of Reference Method Modified	Justification for Modification	Validation of Modification
Tissue matrix extraction: reduced liquid-solid shake/decant steps to 2; reduced shake time; omitted concentration step	Section 11.4.4, 11.4.6, 11.4.8	Improved performance & reduced sample processing time	MDL, IDOC, PT
Clearly defined the characteristics used to distinguish Aqueous vs. Biosolid vs. Solid matrices	n/a	Increased clarity in process decision making, improved first-run performance	MDL, IDOC, PT

When applicable, comparability and/or equivalency studies necessary to validate the modification as required per corporate SOP ENV-SOP-CORQ-0011, *Method Validation and Instrument Verification*, are retained by local quality personnel for historical reference.

14.0 RESPONSIBILITIES

- PAS employees that perform any part this procedure in their work activities must have a signed Read and Acknowledgement Statement (R&A) in their training file for the version(s) of the SOP that were in effect during the time the employee performed the activity.
- PAS supervisors and managers, however named, are responsible for training employees on the procedures in this SOP, implementing the SOP in the work area, and monitoring on-going adherence to the SOP in the work area(s) they oversee.
- PAS employees are responsible for following the procedures in this SOP. Unauthorized deviations or departures from this SOP are not allowed except with documented approval from the local QM and only when those deviations do not violate the Pace® Code of Ethics or Professional Conduct (COR-POL-0004) or associated policy and procedure(s). Hand-edits or manual changes to the SOP are not permitted. If a change is desired or necessary, Pace® employees must follow the procedures for document revision specified in corporate SOPs ENV-SOP-CORQ-0015, *Document Management* and ENV-SOP-CORQ-0016, *SOP for Creation of SOP and SWI.*

15.0 ATTACHMENTS

- Appendix A: Routine Analyte Limits (DL, LOQ), Analytical Parameters, and Calibration
- Appendix B: QC Summary & Corrective Action; Table: Method Acceptance Criteria
- Appendix C: State/Program Specific Requirements
- Appendix D: Sample Pre-screening Instructions
- Appendix E: Aqueous Sample Subsampling Instructions
- Appendix F: MS/MSD, MS/DUP Selection Protocols
- Appendix G: Aqueous Sample Management Decision Guide
- Appendix H: Aqueous Sample Centrifugation Protocol

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- Appendix I: Separation and Analysis of Liquid-Solid Biphasic Matrices
- Appendix J: TCLP/SPLP by 1633
- Appendix K: Wipe Analysis by 1633
- Appendix L: Articles of Commerce Analysis via Cryomill Processing
- Appendix M: Procedure for Total Oxidizable Precursors (TOP)

16.0 REFERENCES

- ENV-POL-CORQ-0005, *Acceptable Calibration Practices*, current version.
- ENV-SOP-CORQ-0006, *Manual Integration*, current version.
- ENV-SOP-CORQ-0011, *Method Validation and Instrument Verification*, current version.
- ENV-SOP-CORQ-0015, *Document Management*, current version.
- ENV-SOP-CORQ-0016, *Standard Operating Procedures and Standard Work Instructions,* current version.
- COR-POL-0004, *Code of Ethics and Professional Conduct*, current version.
- COR-MAN-001, *Pace® Safety Manua*l, current version.
- ENV-MAN-WEST-0001, *Quality Manual*, current version.
- TNI Standard, "Volume 1 Management and Technical Requirements for Laboratories Performing Environmental Analysis", current version.
- "Working with Carcinogens," Department of Health, Education, & Welfare, Public Health Service, Centers for Disease Control, NIOSH, Publication 77-206, August 1977, NTIS PB-277256.
- "OSHA Safety and Health Standards, General Industry," OSHA 2206, 29 CFR 1910.
- "Safety in Academic Chemistry Laboratories," ACS Committee on Chemical Safety, 1979.
- "Standard Methods for the Examination of Water and Wastewater," 18th edition and later revisions, American Public Health Association, 1015 15th St, NW, Washington, DC 20005, 1-35: Section 1090 (Safety), 1992.
- "Standard Practice for Sampling Water," ASTM Annual Book of Standards, ASTM, 1916 Race Street, Philadelphia, PA 19103-1187, 1980.
- "Handbook of Analytical Quality Control in Water and Wastewater Laboratories," USEPA EMSL, Cincinnati, OH 45268, EPA 600/4-79-019, April 1979.
- "Less is Better: Laboratory Chemical Management for Waste Reduction," American Chemical Society, 1993. Available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th Street NW, Washington, DC 20036.
- "Environmental Management Guide for Small Laboratories," USEPA, Small Business Division, Washington DC, EPA 233-B-00-001, May 2000.

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- "The Waste Management Manual for Laboratory Personnel," American Chemical Society, 1990. Available from the American Chemical Society's Department of Government Relations and Science Policy, 1155 16th Street NW, Washington, DC 20036.
- SERDP. Single-Laboratory Validation Study of PFAS by Isotope Dilution LC-MS/MS. ER19-1409. January 26, 2022.
- Woudneh, Million B., Bharat Chandramouli, Coreen Hamilton, Richard Grace, 2019, "Effects of Sample Storage on the Quantitative Determination of 29 PFAS: Observation of Analyte Interconversions during Storage", Environmental Science and Technology 53(21): 12576-12585.
- EPA. Method 1633, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS. January 2024.
- Standard Method for the Examination of Water and Wastewater, 23rd Edition, 2017 – Total, Fixed, and Volatile Solids in Solid and Semisolid Samples, Method 2540.

17.0 REVISION HISTORY

Revisions Made from Prior Version

Section	Description of Change
	N/A: new document

Document Succession: This version replaces the following document(s):

Document Number	Version	Document Title	Effective Date:
N/A	N/A	N/A	N/A

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Appendix A: Routine Analyte Limits (DL, LOQ), Analytical Parameters, and Calibration

DL and LOQ are always adjusted to account for actual amounts used and for dilution. Values listed are as of effective date of this SOP. DL and LOQ are subject to change. Contact quality personnel for current information. See Table 4 below for more information regarding analyte detection and quantitation.

Table 1: Standard Analyte List – Aqueous and Landfill Leachate Matrices

Analyte Abbreviation	CAS #	Aqueous (ng/L)		Leachate (ng/L)	
		DL	LOQ	DL	LOQ
PFBA	375-73-5	0.527	6.4	2.64	32
PFPeA	2706-91-4	0.359	3.2	1.79	16
PFHxA	355-46-4	0.245	1.6	1.22	8
PFHpA	375-92-8	0.238	1.6	1.19	8
PFOA	1763-23-1	0.263	1.6	1.31	8
PFNA	68259-12-1	0.266	1.6	1.33	8
PFDA	335-77-3	0.210	1.6	1.05	8
PFUnA	79780-39-5	0.178	1.6	0.892	8
PFDoA	375-73-5	0.214	1.6	1.07	8
PFTrDA	2706-91-4	0.187	1.6	0.934	8
PFTeDA	355-46-4	0.160	1.6	0.801	8
PFBS	375-73-5	0.402	1.6	2.01	8
PFPeS	2706-91-4	0.206	1.6	1.03	8
PFHxS	355-46-4	0.133	1.6	0.665	8
PFHpS	375-92-8	0.201	1.6	1.00	8
PFOS	1763-23-1	0.264	1.6	1.32	8
PFNS	68259-12-1	0.203	1.6	1.02	8
PFDS	335-77-3	0.140	1.6	0.699	8
PFDoS	79780-39-5	0.242	1.6	1.21	8
4:2 FTS	757124-72-4	0.910	6.4	4.55	32
6:2 FTS	27619-97-2	4.82	6.4	24.1	32
8:2 FTS	39108-34-4	1.22	6.4	6.11	32
PFOSA	754-91-6	0.097	1.6	.484	8
NMeFOSA	31506-32-8	0.226	1.6	1.13	8
NEtFOSA	4151-50-2	0.351	1.6	1.76	8

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Analyte Abbreviation	CAS #	Aqueous (ng/L)		Leachate (ng/L)	
		DL	LOQ	DL	LOQ
NMeFOSAA	2355-31-9	0.483	1.6	2.41	8
NEtFOSAA	2991-50-6	0.478	1.6	2.39	8
NMeFOSE	24448-09-7	1.30	16	6.52	80
NEtFOSE	1691-99-2	1.10	16	5.50	80
HFPO-DA	13252-13-6	1.60	6.4	8.02	32
ADONA	919005-14-4	0.376	6.4	1.88	32
PFMPA	377-73-1	0.244	3.2	1.22	16
PFMBA	863090-89-5	0.360	3.2	1.80	16
NFDHA	151772-58-6	0.541	3.2	2.71	16
9Cl-PF3ONS	756426-58-1	0.442	6.4	2.21	32
11Cl-PF3OUdS	763051-92-9	0.447	6.4	2.23	32
PFEESA	113507-82-7	0.330	3.2	1.65	16
3:3 FTCA	356-02-5	0.535	8	2.68	40
5:3 FTCA	914637-49-3	4.26	40	21.3	200
7:3 FTCA	812-70-4	3.18	40	15.9	200

Table 2: Standard Analyte List – Solid and Biosolid Matrices

Analyte Abbreviation	CAS #	Solid (ng/g)		Biosolid (ng/g)	
		DL	LOQ	DL	LOQ
PFBA	375-73-5	0.028	0.8	0.28	8
PFPeA	2706-91-4	0.038	0.4	0.38	4
PFHxA	355-46-4	0.016	0.2	0.16	2
PFHpA	375-92-8	0.012	0.2	0.12	2
PFOA	1763-23-1	0.026	0.2	0.26	2
PFNA	68259-12-1	0.012	0.2	0.12	2
PFDA	335-77-3	0.035	0.2	0.35	2
PFUnA	79780-39-5	0.013	0.2	0.13	2
PFDoA	375-73-5	0.021	0.2	0.21	2
PFTrDA	2706-91-4	0.016	0.2	0.16	2
PFTeDA	355-46-4	0.024	0.2	0.24	2
PFBS	375-73-5	0.020	0.2	0.20	2

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Analyte Abbreviation	CAS #	Solid (ng/g)		Biosolid (ng/g)	
		DL	LOQ	DL	LOQ
PFPeS	2706-91-4	0.027	0.2	0.27	2
PFHxS	355-46-4	0.020	0.2	0.20	2
PFHpS	375-92-8	0.045	0.2	0.45	2
PFOS	1763-23-1	0.031	0.2	0.31	2
PFNS	68259-12-1	0.029	0.2	0.29	2
PFDS	335-77-3	0.015	0.2	0.15	2
PFDoS	79780-39-5	0.022	0.2	0.22	2
4:2 FTS	757124-72-4	0.078	0.8	0.78	8
6:2 FTS	27619-97-2	0.148	0.8	1.48	8
8:2 FTS	39108-34-4	0.259	0.8	2.59	8
PFOSA	754-91-6	0.011	0.2	0.11	2
NMeFOSA	31506-32-8	0.026	0.2	0.26	2
NEtFOSA	4151-50-2	0.022	0.2	0.22	2
NMeFOSAA	2355-31-9	0.086	0.2	0.86	2
NEtFOSAA	2991-50-6	0.044	0.2	0.44	2
NMeFOSE	24448-09-7	0.121	2.0	1.21	20
NEtFOSE	1691-99-2	0.081	2.0	0.81	20
HFPO-DA	13252-13-6	0.039	0.8	0.39	8
ADONA	919005-14-4	0.030	0.8	0.30	8
PFMPA	377-73-1	0.017	0.4	0.17	4
PFMBA	863090-89-5	0.024	0.4	0.24	4
NFDHA	151772-58-6	0.083	0.4	0.83	4
9Cl-PF3ONS	756426-58-1	0.029	0.8	0.29	8
11Cl-PF3OUdS	763051-92-9	0.040	0.8	0.40	8
PFEESA	113507-82-7	0.046	0.4	0.46	4
3:3 FTCA	356-02-5	0.092	1.0	0.92	10
5:3 FTCA	914637-49-3	0.236	5.0	2.36	50
7:3 FTCA	812-70-4	0.365	5.0	3.65	50

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Table 3: Standard Analyte List – Tissue Matrices

Analyte Abbreviation	CAS #	DL (ng/g)	LOQ (ng/g)
PFBA	375-73-5	0.215	2.0
PFPeA	2706-91-4	0.088	1.0
PFHxA	355-46-4	0.044	0.5
PFHpA	375-92-8	0.062	0.5
PFOA	1763-23-1	0.070	0.5
PFNA	68259-12-1	0.099	0.5
PFDA	335-77-3	0.102	0.5
PFUnA	79780-39-5	0.093	0.5
PFDoA	375-73-5	0.052	0.5
PFTrDA	2706-91-4	0.067	0.5
PFTeDA	355-46-4	0.039	0.5
PFBS	375-73-5	0.044	0.5
PFPeS	2706-91-4	0.029	0.5
PFHxS	355-46-4	0.075	0.5
PFHpS	375-92-8	0.093	0.5
PFOS	1763-23-1	0.084	0.5
PFNS	68259-12-1	0.065	0.5
PFDS	335-77-3	0.056	0.5
PFDoS	79780-39-5	0.062	0.5
4:2 FTS	757124-72-4	0.222	2.0
6:2 FTS	27619-97-2	0.934	2.0
8:2 FTS	39108-34-4	0.249	2.0
PFOSA	754-91-6	0.051	0.5
NMeFOSA	31506-32-8	0.139	0.5
NEtFOSA	4151-50-2	0.115	0.5
NMeFOSAA	2355-31-9	0.089	0.5
NEtFOSAA	2991-50-6	0.106	0.5
NMeFOSE	24448-09-7	0.598	5.0
NEtFOSE	1691-99-2	0.410	5.0
HFPO-DA	13252-13-6	0.072	2.0

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Analyte Abbreviation	CAS #	DL (ng/g)	LOQ (ng/g)
ADONA	919005-14-4	0.139	2.0
PFMPA	377-73-1	0.078	1.0
PFMBA	863090-89-5	0.086	1.0
NFDHA	151772-58-6	0.113	1.0
9Cl-PF3ONS	756426-58-1	0.179	2.0
11Cl-PF3OUdS	763051-92-9	0.228	2.0
PFEESA	113507-82-7	0.069	1.0
3:3 FTCA	356-02-5	0.145	2.5
5:3 FTCA	914637-49-3	1.54	12.5
7:3 FTCA	812-70-4	1.26	12.5

Table 4: Identification and Quantification Information for Target Analytes, Extracted Internal Standards and Non-extracted Internal Standards.

Analyte Name	CAS #	Analyte Abbreviation	Parent Ion Mass	Quantification Ion Mass	Confirmation Ion Mass	Quantification Reference Compound
Perfluorobutanoic acid	375-73-5	PFBA	213	169	NA	13C4-PFBA
Perfluoropentanoic acid	2706-91-4	PFPeA	263	219	69	13C5-PFPeA
Perfluorohexanoic acid	355-46-4	PFHxA	313	269	119	13C5-PFHxA
Perfluoroheptanoic acid	375-92-8	PFHpA	363	319	169	13C4-PFHpA
Perfluorooctanoic acid	1763-23-1	PFOA	413	369	169	13C8-PFOA
Perfluorononanoic acid	68259-12-1	PFNA	463	419	219	13C9-PFNA
Perfluorodecanoic acid	335-77-3	PFDA	513	469	219	13C6-PFDA
Perfluoroundecanoic acid	79780-39-5	PFUnA	563	519	269	13C7-PFUnA
Perfluorododecanoic acid	375-73-5	PFDoA	613	569	319	13C2-PFDoA
Perfluorotridecanoic acid	2706-91-4	PFTrDA	663	619	169	13C2-PFDoA
Perfluorotetradecanoic acid	355-46-4	PFTeDA	713	669	169	13C2-PFTeDA
Perfluorobutanesulfonic acid	375-73-5	PFBS	299	80	99	13C3-PFBS
Perfluoropentansulfonic acid	2706-91-4	PFPeS	349	80	99	13C3-PFHxS
Perfluorohexanesulfonic acid	355-46-4	PFHxS	399	80	99	13C3-PFHxS

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Analyte Name	CAS #	Analyte Abbreviation	Parent Ion Mass	Quantification Ion Mass	Confirmation Ion Mass	Quantification Reference Compound
Perfluoroheptanesulfonic acid	375-92-8	PFHpS	449	80	99	13C8-PFOS
Perfluorooctanesulfonic acid	1763-23-1	PFOS	499	80	99	13C8-PFOS
Perfluorononanesulfonic acid	68259-12-1	PFNS	549	80	99	13C8-PFOS
Perfluorodecanesulfonic acid	335-77-3	PFDS	599	80	99	13C8-PFOS
Perfluorododecanesulfonic acid	79780-39-5	PFDoS	699	80	99	13C8-PFOS
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	757124-72-4	4:2 FTS	327	307	81	13C2-4:2FTS
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	27619-97-2	6:2 FTS	427	407	81	13C2-6:2FTS
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	39108-34-4	8:2 FTS	527	507	81	13C2-8:2FTS
Perfluorooctanesulfonamide	754-91-6	PFOSA	498	78	478	13C8-PFOSA
N-methyl perfluorooctanesulfonamide	31506-32-8	NMeFOSA	512	219	169	D3-NMeFOSA
N-ethyl perfluorooctanesulfonamide	4151-50-2	NEtFOSA	526	219	169	D5-NEtFOSA
N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9	NMeFOSAA	570	419	483	D3-NMeFOSAA
N-ethyl perfluorooctanesulfonamidoacetic acid	2991-50-6	NEtFOSAA	584	419	526	D5-NEtFOSAA
N-methyl perfluorooctanesulfonamidoethanol	24448-09-7	NMeFOSE	616	59	NA	D7-NMeFOSE
N-ethyl perfluorooctanesulfonamidoethanol	1691-99-2	NEtFOSE	630	59	NA	D9-NEtFOSE
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	HFPO-DA	285	169	185	13C3-HFPODA
4,8-Dioxa-3H-perfluorononanoic acid	919005-14-4	ADONA	377	251	85	13C4-PFHpA
Perfluoro-3-methoxypropanoic acid	377-73-1	PFMPA	229	85	NA	13C4-PFBA
Perfluoro-4-methoxybutanoic acid	863090-89-5	PFMBA	279	85	NA	13C5-PFPeA
Nonafluoro-3,6-dioxaheptanoic acid	151772-58-6	NFDHA	295	201	85	13C5-PFHxA

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Analyte Name	CAS #	Analyte Abbreviation	Parent Ion Mass	Quantification Ion Mass	Confirmation Ion Mass	Quantification Reference Compound
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	756426-58-1	9Cl-PF3ONS	531	351	533→353	13C8-PFOS
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9	11Cl-PF3OUdS	631	451	633→453	13C8-PFOS
Perfluoro(2-ethoxyethane)sulfonic acid	113507-82-7	PFEESA	315	135	83	13C5-PFHxA
3-Perfluoropropyl propanoic acid (FPrPA)	356-02-5	3:3FTCA	241	177	117	13C5-PFPeA
2H,2H,3H,3H-Perfluorooctanoic acid (FPePA)	914637-49-3	5:3FTCA	341	237	217	13C5-PFHxA
3-Perfluoroheptyl propanoic acid (FHpPA)	812-70-4	7:3FTCA	441	337	317	13C9-PFNA
Extracted Internal Standard Compounds (EIS)						
Perfluoro-n-[13C4] butanoic acid	NA	13C4-PFBA	217	172	NA	13C3-PFBA
Perfluoro-n-[13C5] pentanoic acid	NA	13C5-PFPeA	268	223	NA	13C2-PFHxA
Perfluoro-n-[1,2,3,4,6-13C5] hexanoic acid	NA	13C5-PFHxA	318	273	NA	13C2-PFHxA
Perfluoro-n-[1,2,3,4-13C4] heptanoic acid	NA	13C4-PFHpA	367	322	NA	13C2-PFHxA
Perfluoro-n-[13C8] octanoic acid	NA	13C8-PFOA	421	376	NA	13C4-PFOA
Perfluoro-n-[13C9] nonanoic acid	NA	13C9-PFNA	472	427	NA	13C5-PFNA
Perfluoro-n-[1,2,3,4,5,6-13C6] decanoic acid	NA	13C6-PFDA	519	474	NA	13C2-PFDA
Perfluoro-n-[1,2,3,4,5,6,7-13C7] undecanoic acid	NA	13C7-PFUnA	570	525	NA	13C2-PFDA
Perfluoro-n-[1,2-13C2] dodecanoic acid	NA	13C2-PFDoA	615	570	NA	13C2-PFDA
Perfluoro-n-[1,2-13C2] tetradecanoic acid	NA	13C2-PFTeDA	715	670	NA	13C2-PFDA
Perfluoro-1-[2,3,4-13C3] butanesulfonic acid	NA	13C3-PFBS	302	80	NA	18O2-PFHxS
Perfluoro-1-[1,2,3-13C3] hexanesulfonic acid	NA	13C3-PFHxS	402	80	NA	18O2-PFHxS

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Analyte Name	CAS #	Analyte Abbreviation	Parent Ion Mass	Quantification Ion Mass	Confirmation Ion Mass	Quantification Reference Compound
Perfluoro-1-[13C8] octanesulfonic acid	NA	13C8-PFOS	507	80	NA	13C4-PFOS
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2] hexanesulfonic acid	NA	13C2-4:2FTS	329	81	NA	18O2-PFHxS
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2] octanesulfonic acid	NA	13C2-6:2FTS	429	81	NA	18O2-PFHxS
1H,1H,2H,2H-Perfluoro-1-[1,2-13C2] decanesulfonic acid	NA	13C2-8:2FTS	529	81	NA	18O2-PFHxS
Perfluoro-1-[13C8] octanesulfonamide	NA	13C8-PFOSA	506	78	NA	13C4-PFOS
N-methyl-D3-perfluoro-1-octanesulfonamide	NA	D3-NMeFOSA	515	219	NA	13C4-PFOS
N-ethyl-D5-perfluoro-1-octanesulfonamide	NA	D5-NEtFOSA	531	219	NA	13C4-PFOS
N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid	NA	D3-NMeFOSAA	573	419	NA	13C4-PFOS
N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid	NA	D5-NEtFOSAA	589	419	NA	13C4-PFOS
N-methyl-D7-perfluorooctanesulfonamidoethanol	NA	D7-NMeFOSE	623	59	NA	13C4-PFOS
N-ethyl-D9-perfluorooctanesulfonamidoethanol	NA	D9-NEtFOSE	639	59	NA	13C4-PFOS
Tetrafluoro-2-heptafluoropropoxy-13C3-propanoic acid	NA	13C3-HFPO-DA	287	169	NA	13C2-PFHxA
Non-extracted Internal Standard Compounds (NIS)						
Perfluoro-n-[2,3,4-13C3] butanoic acid	NA	13C3-PFBA	216	172	NA	NA
Perfluoro-n-[1,2-13C2]hexanoic acid	NA	13C2-PFHxA	315	270	NA	NA
Perfluoro-n-[1,2,3,4-13C4]octanoic acid	NA	13C4-PFOA	417	172	NA	NA
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	NA	13C5-PFNA	468	423	NA	NA

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Analyte Name	CAS #	Analyte Abbreviation	Parent Ion Mass	Quantification Ion Mass	Confirmation Ion Mass	Quantification Reference Compound
Perfluoro-n-[1,2-13C2]decanoic acid	NA	13C2-PFDA	515	470	NA	NA
Perfluoro-1-hexane[18O2]sulfonic acid	NA	18O2-PFHxS	403	84	NA	NA
Perfluoro-n-[1,2,3,4-13C4] octanesulfonic acid	NA	13C4-PFOS	503	80	NA	NA

Table 5: Calibration Standard Concentrations (ng/mL)

Compound	L1	L2 (ISC)	L3	L4	L5 (CCV)	L6	L7	L8	L9
Perfluoroalkyl carboxylic acids									
PFBA	0.4	0.8	2	10	20	50	100	200	250
PFPeA	0.2	0.4	1	5	10	25	50	100	125
PFHxA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFHpA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFOA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFNA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFDA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFUnA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFDoA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFTrDA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
PFTeDA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
Perfluoroalkyl sulfonic acids									
PFBS	0.089	0.178	0.444	2.22	4.44	11.1	22.2	44.4	55.5
PFPeS	0.094	0.188	0.470	2.35	4.70	11.8	23.5	47.0	58.8
PFHxS	0.091	0.182	0.456	2.28	4.56	11.4	22.8	45.6	57.0
PFHpS	0.095	0.190	0.476	2.38	4.76	11.9	23.8	47.6	59.5
PFOS	0.093	0.186	0.464	2.32	4.64	11.6	23.2	46.4	58.0
PFNS	0.096	0.192	0.480	2.40	4.80	12.0	24.0	48.0	60.0
PFDS	0.096	0.193	0.482	2.41	4.82	12.1	24.1	48.2	60.3
PFDoS	0.097	0.194	0.484	2.42	4.84	12.1	24.2	48.4	60.5
Fluorotelomer sulfonic acids									
4:2FTS	0.375	0.750	1.87	9.37	18.7	46.9	93.7	187	234
6:2FTS	0.380	0.761	1.90	9.51	19.0	47.6	95.1	190	238
8:2FTS	0.384	0.768	1.92	9.6	19.2	48	96	192	240
Perfluorooctane sulfonamides									

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Compound	L1	L2 (ISC)	L3	L4	L5 (CCV)	L6	L7	L8	L9
PFOSA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
NMeFOSA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
NEtFOSA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
Perfluorooctane sulfonamidoacetic acids									
NMeFOSAA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
NEtFOSAA	0.1	0.2	0.5	2.5	5	12.5	25	50	62.5
Perfluorooctane sulfonamide ethanols									
NMeFOSE	1	2	5	25	50	125	250	500	625
NEtFOSE	1	2	5	25	50	125	250	500	625
Per- and polyfluoroether carboxylic acids									
HFPO-DA	0.4	0.8	2	10	20	50	100	200	250
ADONA	0.378	0.756	1.89	9.45	18.9	47.25	94.5	189	236.25
PFMPA	0.2	0.4	1	5	10	25	50	100	125
PFMBA	0.2	0.4	1	5	10	25	50	100	125
NFDHA	0.2	0.4	1	5	10	25	50	100	125
Ether sulfonic acids									
9Cl-PF3ONS	0.373	0.746	1.87	9.33	18.7	46.7	93.3	187	233
11Cl-PF3OUdS	0.377	0.754	1.89	9.43	18.9	47.2	94.3	189	236
PFEESA	0.178	0.357	0.892	4.46	8.92	22.3	44.6	89.2	112
Fluorotelomer Carboxylic Acids									
3:3FTCA	0.5	1	2.5	12.5	25	62.5	125	250	312.5
5:3FTCA	2.5	5	12.5	62.5	125	312.5	625	1250	1560
7:3FTCA	2.5	5	12.5	62.5	125	312.5	625	1250	1560
Extracted Internal Standards (EIS)									
13C4-PFBA	10	10	10	10	10	10	10	10	10
13C5-PFPeA	5	5	5	5	5	5	5	5	5
13C5-PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13C4-PFHpA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13C8-PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13C9-PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C6-PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C7-PFUnA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C2-PFDoA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C2-PFTeDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C3-PFBS	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
13C3-PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
13C8-PFOS	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
13C2-4:2FTS	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69	4.69

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Compound	L1	L2 (ISC)	L3	L4	L5 (CCV)	L6	L7	L8	L9
13C2-6:2FTS	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
13C2-8:2FTS	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
13C8-PFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
D3-NMeFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
D5-NEtFOSA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
D3-NMeFOSAA	5	5	5	5	5	5	5	5	5
D5-NEtFOSAA	5	5	5	5	5	5	5	5	5
D7-NMeFOSE	25	25	25	25	25	25	25	25	25
D9-NEtFOSE	25	25	25	25	25	25	25	25	25
13C3-HFPODA	10	10	10	10	10	10	10	10	10
Non-Extracted Internal Standards (NIS)									
13C3-PFBA	5	5	5	5	5	5	5	5	5
13C2-PFHxA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13C4-PFOA	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
13C5-PFNA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
13C2-PFDA	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
18O2-PFHxS	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
13C4-PFOS	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40

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Appendix B: QC Summary & Corrective Action Table; Method Acceptance Criteria

Table 6: QC Summary & Corrective Action

QC Item	Frequency	Acceptance Criteria	Corrective Action	Qualification
Demonstration of Capability (DOC)	Initially, prior to analyzing field samples and annually thereafter.	See Method Acceptance Criteria for each matrix in the Tables below.	Identify and correct source of problem, repeat.	None. Do not proceed with analysis.
Mass Calibration	Annually and on as-needed basis.	Must meet manufacturer's acceptance criteria.	Identify and correct source of problem, repeat.	None. Do not proceed with analysis.
Mass Calibration Verification	After each Mass Calibration performed.	Must meet manufacturer's acceptance criteria.	Identify and correct source of problem, repeat Mass Calibration.	None. Do not proceed with analysis.
Initial Calibration (ICAL)	At instrument set up, after CCV failure and/or major maintenance.	Must meet one of the curve fit options presented in Section 9.2.4.	Identify and correct source of problem, repeat.	None. Do not proceed with analysis.
Initial Calibration Verification (ICV)	After Each ICAL.	All analytes must be within ± 30% of their true values. (%R)	Identify and correct source of problem, re-analyze. If repeat failure, repeat ICAL. Analysis may proceed if it can be demonstrated that the ICV exceedance has no impact on analytical measurements. For example, the ICV %R is high, CCV is within criteria, and the analyte is not detected in sample(s).	Qualify analytes with ICV out of criteria when results are unaffected; otherwise, correct the problem and repeat ICV.
Initial Calibration Blank (ICB)	After highest concentration ICAL standard.	Must meet criteria specified in Section 9.2.5: all detections ≤MDL concentration.	Identify and correct source of contamination or performance issue. Alternately, calibrate using a lower concentration standard for the highest point.	No samples shall be analyzed until ICB has met acceptance criteria.
RT Window Position	Once per ICAL and at the beginning of the analytical window.	Position is set using the mid-point of the ICAL on the day ICAL is performed; otherwise, opening CCV is used. RT Window is ± 60 secs from RT position.	NA	NA
Instrument Sensitivity Check (ISC)	Daily before sample analysis.	All native and isotopically labelled compounds within ± 30% recovery.	Identify and correct source of problem and reanalyze ISC. If problem persists, repeat ICAL.	No samples shall be analyzed until ISC has met acceptance

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QC Item	Frequency	Acceptance Criteria	Corrective Action	Qualification
				criteria. See Section 9.2.4.5 for exceptions.
Bile Salts Check	With each ICAL and daily with each CCV	Bile Salt peak detected >1 min outside RT window for PFOS.	Identify and correct source of problem, then reevaluate Bile Salts separation from PFOS.	No samples shall be analyzed until Bile Salts Check has met acceptance criteria.
Continuing Calibration Verification (CCV)	Daily before sample analysis, after every 10 samples, and at end of analytical sequence.	All native and isotopically labelled compounds within ±30% recovery.	See Section 9.2.4.5 for required corrective actions based on circumstance.	Qualify analytes with CCV out of criteria.
Instrument Blank (IBLK) / Continuing Calibration Blank (CCB)	Daily prior to analysis and after high standards, including CCV.	Must meet criteria specified in Section 9.2.5: all detections ≤MDL concentration.	Identify and correct source of contamination or performance issue. Reanalyze IBLK.	No samples shall be analyzed until IBLK has met acceptance criteria.
Extracted Internal Standards (EIS)	Every field sample, standard and QC sample.	See Method Acceptance Criteria for each matrix in the Tables below.	If batch QC is acceptable, reanalyze to confirm. If confirmed, re-extract and reanalyze samples. If reprep is within acceptance, report reprep data. If failure is confirmed by reprep, qualify as matrix impacted.	Qualify outages and explain in case narrative.
Non-extracted Internal Standards (NIS)	Every field sample, standard and QC sample.	NIS areas in all samples must be within 50 – 200% of the average area of the corresponding NIS in the ICAL.	Troubleshoot instrument performance. Reanalyze samples.	Qualify outages and explain in case narrative.
Method Blank (MB)	1 per batch of 20 or fewer samples.	Must meet criteria specified in Section 10.4.1: all detections ≤MDL concentration.	If IBLK is acceptable, reanalyze MB to confirm. If confirmed, re-extract and reanalyze associated impacted samples (if sufficient sample remains). If insufficient sample remains for reprep, narrate and report data associated with unacceptable MB. See Section 10.4.1 for more details.	Qualify outages and explain in case narrative.

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QC Item	Frequency	Acceptance Criteria	Corrective Action	Qualification
LCS/LLLCS	1 pair per batch of 20 or fewer samples.	See Method Acceptance Criteria for each matrix in the Tables below; must meet criteria specified in Section 10.4.2.	If most recent ISC/CCV is acceptable, reanalyze LCS to confirm. If low-failure results are confirmed, re-extract and reanalyze associated samples (if sufficient sample remains). If insufficient sample remains for reprep, narrate and report data associated with low-failure LCS. If high-failure results are confirmed and sample(s) is ND for failing compound, narrate and report sample data.	Qualify outages and explain in case narrative.
MS/MSD	1 pair per batch of 20 or fewer samples. (If requested)	RSD ≤30% between MS/MSD	If possible, reprep to confirm.	Qualify outages and explain in case narrative.
Laboratory Duplicate	1 per AFFF sample; 1 per prep batch for all other matrices (if requested).	RSD ≤30% between parent/DUP	If possible, reprep to confirm.	Qualify outages and explain in case narrative.

Table 7: DOC/LCS/LLLCS Acceptance Limits for Aqueous & Landfill Leachate Matrices

Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFBA	70-135	21	70-140
PFPeA	70-135	23	65-135
PFHxA	70-135	24	70-145
PFHpA	70-135	28	70-150
PFOA	65-155	27	70-150
PFNA	70-140	28	70-150
PFDA	65-140	26	70-140
PFUnA	70-135	29	70-145
PFDoA	70-130	21	70-140
PFTrDA	60-145	29	65-140
PFTeDA	70-145	27	60-140
PFBS	70-140	23	60-145
PFPeS	70-135	25	65-140
PFHxS	70-135	27	65-145
PFHpS	70-140	30	70-150
PFOS	70-140	29	55-150
PFNS	70-135	29	65-145
PFDS	70-135	30	60-145

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Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFDoS	45-135	35	50-145
4:2FTS	70-135	27	70-145
6:2FTS	70-135	32	65-155
8:2FTS	70-140	33	60-150
PFOSA	70-135	22	70-145
NMeFOSA	70-135	30	60-150
NEtFOSA	70-130	26	65-145
NMeFOSAA	65-140	32	50-140
NEtFOSAA	70-135	28	70-145
NMeFOSE	70-135	29	70-145
NEtFOSE	70-130	21	70-135
HFPO-DA	70-135	23	70-140
ADONA	70-135	23	65-145
PFMPA	60-140	23	55-140
PFMBA	65-145	27	60-150
NFDHA	65-140	37	50-150
9Cl-PF3ONS	70-145	30	70-155
11Cl-PF3OUdS	50-150	35	55-160
PFEESA	70-135	25	70-140
3:3FTCA	70-130	23	65-130
5:3FTCA	70-130	24	70-135
7:3FTCA	55-130	34	50-145

Table 8: DOC/LCS/LLLCS Acceptance Limits for Solid & Biosolid Matrices

Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFBA	70-140	17	70-140
PFPeA	70-140	26	60-150
PFHxA	70-135	23	65-140
PFHpA	70-140	21	65-145
PFOA	70-140	23	70-150
PFNA	65-145	24	70-155
PFDA	70-145	26	70-155
PFUnA	70-145	26	70-155
PFDoA	70-145	25	70-150
PFTrDA	55-160	26	65-150
PFTeDA	70-145	24	65-150
PFBS	60-145	25	65-145
PFPeS	65-140	29	55-160
PFHxS	65-145	28	60-150
PFHpS	70-140	27	65-155
PFOS	70-135	27	65-160
PFNS	70-140	27	55-140

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Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFDS	50-150	31	40-155
PFDoS	40-140	40	25-160
4:2FTS	70-135	27	60-150
6:2FTS	60-160	50	55-200
8:2FTS	70-140	27	70-150
PFOSA	70-140	19	70-140
NMeFOSA	65-145	26	70-155
NEtFOSA	70-135	19	70-140
NMeFOSAA	65-145	31	65-155
NEtFOSAA	60-150	31	65-165
NMeFOSE	70-140	19	70-140
NEtFOSE	70-135	17	70-135
HFPO-DA	70-140	25	70-145
ADONA	70-155	26	70-160
PFMPA	70-140	25	30-140
PFMBA	55-145	33	60-150
NFDHA	45-145	27	60-155
9Cl-PF3ONS	65-135	23	70-150
11Cl-PF3OUdS	50-135	31	45-160
PFEESA	70-140	20	70-140
3:3FTCA	45-155	32	45-130
5:3FTCA	70-135	28	60-130
7:3FTCA	70-145	39	60-150

Table 9: DOC/LCS/LLLCS Acceptance Limits for Tissue Matrix

Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFBA	70-135	20	60-140
PFPeA	70-130	20	60-145
PFHxA	70-140	20	60-160
PFHpA	70-140	20	60-145
PFOA	70-130	25	60-150
PFNA	70-140	20	60-145
PFDA	70-135	20	60-150
PFUnA	70-135	20	60-155
PFDoA	70-135	20	60-140
PFTrDA	55-160	20	60-150
PFTeDA	70-140	25	60-140
PFBS	70-145	20	60-150
PFPeS	70-150	20	60-145
PFHxS	70-140	25	60-155
PFHpS	70-145	20	60-140
PFOS	70-135	30	60-160

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Target Analyte	DOC Mean Recovery (%)	DOC RSD (%)	LCS/LLLCS Recovery (%)
PFNS	60-130	20	45-140
PFDS	55-135	20	50-140
PFDoS	25-145	45	25-140
4:2FTS	65-140	30	55-150
6:2FTS	70-140	25	60-150
8:2FTS	70-150	25	60-170
PFOSA	70-140	20	60-150
NMeFOSA	70-140	30	60-160
NEtFOSA	70-140	40	60-150
NMeFOSAA	70-140	20	60-145
NEtFOSAA	70-140	25	60-145
NMeFOSE	60-150	20	40-180
NEtFOSE	70-145	40	60-205
HFPO-DA	70-140	25	60-145
ADONA	70-145	20	55-165
PFMPA	70-145	40	25-145
PFMBA	70-140	20	60-150
NFDHA	70-155	30	60-180
9Cl-PF3ONS	70-140	20	60-170
11Cl-PF3OUdS	65-140	20	50-170
PFEESA	70-145	25	50-150
3:3FTCA	55-130	25	30-140
5:3FTCA	70-145	20	60-160
7:3FTCA	70-155	20	60-200

Table 10: Acceptance Limits for EIS and NIS Compounds in Aqueous & Landfill Leachate Matrices

Labeled Compound	Aqueous Recovery (%)	Landfill Leachate Recovery (%)
13C4-PFBA	5-130	5-130
13C5-PFPeA	40-130	40-130
13C5-PFHxA	40-130	40-130
13C4-PFHpA	40-130	40-130
13C8-PFOA	40-130	40-130
13C9-PFNA	40-130	40-130
13C6-PFDA	40-130	40-130
13C7-PFUnA	30-130	40-130
13C2-PFDoA	10-130	35-130
13C2-PFTeDA	10-130	25-130
13C3-PFBS	40-135	40-130
13C3-PFHxS	40-130	40-130
13C8-PFOS	40-130	40-130

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Labeled Compound	Aqueous Recovery (%)	Landfill Leachate Recovery (%)
13C2-4:2FTS	40-200	40-220
13C2-6:2FTS	40-200	40-170
13C2-8:2FTS	40-300	40-145
13C8-PFOSA	40-130	40-130
D3-NMeFOSA	10-130	40-130
D5-NEtFOSA	10-130	35-130
D3-NMeFOSAA	40-170	35-130
D5-NEtFOSAA	25-135	30-130
D7-NMeFOSE	10-130	20-130
D9-NEtFOSE	10-130	20-130
13C3-HFPODA	40-130	40-130
13C3-PFBA	50-200	50-200
13C2-PFHxA	50-200	50-200
13C4-PFOA	50-200	50-200
13C5-PFNA	50-200	50-200
13C2-PFDA	50-200	50-200
18O2-PFHxS	50-200	50-200
13C4-PFOS	50-200	50-200

Table 11: Acceptance Limits for EIS and NIS Compounds in Solid & Biosolid Matrices

Labeled Compound	Solids Recovery (%)	Biosolids Recovery (%)
13C4-PFBA	8-130	5-130
13C5-PFPeA	35-130	35-130
13C5-PFHxA	40-130	40-130
13C4-PFHpA	40-130	40-130
13C8-PFOA	40-130	40-130
13C9-PFNA	40-130	40-145
13C6-PFDA	40-130	40-130
13C7-PFUnA	40-130	40-130
13C2-PFDoA	40-130	40-130
13C2-PFTeDA	20-130	10-160
13C3-PFBS	40-135	40-150
13C3-PFHxS	40-130	40-140
13C8-PFOS	40-130	40-130
13C2-4:2FTS	40-165	40-300
13C2-6:2FTS	40-215	40-300
13C2-8:2FTS	40-275	40-300

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Labeled Compound	Solids Recovery (%)	Biosolids Recovery (%)
13C8-PFOSA	40-130	20-140
D3-NMeFOSA	10-130	20-130
D5-NEtFOSA	10-130	20-130
D3-NMeFOSAA	40-135	30-150
D5-NEtFOSAA	40-150	20-140
D7-NMeFOSE	20-130	25-130
D9-NEtFOSE	15-130	20-130
13C3-HFPODA	40-130	40-130
13C3-PFBA	50-200	50-200
13C2-PFHxA	50-200	50-200
13C4-PFOA	50-200	50-200
13C5-PFNA	50-200	50-200
13C2-PFDA	50-200	50-200
18O2-PFHxS	50-200	50-200
13C4-PFOS	50-200	50-200

Table 12: Acceptance Limits for EIS and NIS Compounds in Tissue Matrices

Labeled Compound	Tissue Recovery (%)
13C4-PFBA	5-130
13C5-PFPeA	10-185
13C5-PFHxA	25-170
13C4-PFHpA	25-150
13C8-PFOA	25-150
13C9-PFNA	35-185
13C6-PFDA	30-150
13C7-PFUnA	30-180
13C2-PFDoA	35-180
13C2-PFTeDA	20-160
13C3-PFBS	25-190
13C3-PFHxS	35-175
13C8-PFOS	40-160
13C2-4:2FTS	30-300
13C2-6:2FTS	35-300
13C2-8:2FTS	40-365
13C8-PFOSA	25-180
D3-NMeFOSA	5-130
D5-NEtFOSA	5-130

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Labeled Compound	Tissue Recovery (%)
D3-NMeFOSAA	30-250
D5-NEtFOSAA	30-235
D7-NMeFOSE	5-160
D9-NEtFOSE	5-130
13C3-HFPODA	20-185
13C3-PFBA	50-200
13C2-PFHxA	50-200
13C4-PFOA	50-200
13C5-PFNA	50-200
13C2-PFDA	50-200
18O2-PFHxS	50-200
13C4-PFOS	50-200

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Appendix C: State/Program Specific Requirements

This appendix provides program specific requirements that supersede or supplement the main body of the SOP. When analyzing samples under DoD compliance, these requirements are applicable.

QC Item	SOP Section	Requirement
Instrument Blank	9.2.5	No analytes detected > ½ LOQ.
Method Blank	11.1.1	No analytes detected > ½ LOQ.
AFFF Sample Duplicate	Appendix E	All AFFF samples shall be prepared and analyzed in duplicate in the same manner as aqueous samples (e.g., solid phase extraction, extracted internal standards, carbon cleanup, etc.).
Laboratory Duplicate	Appendices B & F	One per preparatory batch. RPD of all analytes should be ≤ 30% between sample and DUP. RPD criterion does not apply if both results are below the LOQ.

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Appendix D: Sample Pre-screening Instructions

Samples that are known or suspected to contain high levels of analytes may be pre-screened using the following procedure. These are example procedures using smaller sample aliquots spiked with EIS and NIS and no clean up procedures. Other pre-screening procedures may be used.

Aqueous Samples

1) Weight out 10 (±0.1) g of sample into a 50-mL centrifuge tube.
2) Add 50 µL of EIS to the sample and vortex to mix.
3) Filter 1 mL of the sample through 0.2-µm membrane filter into a microvial. Sample is ready for instrumental analysis.

Solid and Tissue Samples

1) Weigh 1.0 (±0.1) g sample into 50-mL polypropylene centrifuge tubes.
2) Add 20 mL of 0.3% methanolic ammonium hydroxide to the sample. Vortex and mix on a shaker table (or equivalent) for 10 min. Allow to settle and/or centrifuge to produce a clear extract.
3) Filter using a filter vial:
    a. Add 20 µL of EIS to a clean filter vial (chamber).
    b. Add 400 µL of clear extract from step 2 (e.g., by adding extract until it reaches the fill line), carefully vortex to mix.
    c. Use filter/plunger part and filter.
4) Transfer 30 µL of filtrate to a ~300 µL polypropylene microvial and dilute to 300 µL with 0.3% methanolic ammonium hydroxide. Add NIS (1.5 µL) to the resulting solution.
5) The extract is now a 10x dilution.
6) Sample is ready for instrumental screening analysis.
7) Calculate results using the equivalent sample weight computed as follows:

$$Equivalent\ Weight = Sample\ weight\ (g) x \frac{0.4\ mL}{20\ mL}$$

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Appendix E: Aqueous Sample Subsampling Instructions

Note: Because some target analytes may be stratified within the sample (e.g., AFFF-contaminated media, surfactants), or adhere to the walls of the sample container, subsampling may only be done on a project-specific basis. Subsampling has been shown to increase uncertainty in PFAS analysis, especially on foaming samples.

If a reduced sample size is required, transfer a weighed subsample using the following subsampling procedure to a 60-mL HDPE bottle and dilute to approximately 60 mL using reagent water. This container is now considered the "sample bottle."

1) Gently invert sample 3-4 times being careful to avoid foam formation and subsample immediately (do not let stand).
2) If foam forms and more than 5 mL is required – pour sample, avoiding any foam.
3) If foaming forms and a volume less than 5 mL is required – pipette from ½ cm below the foam.
4) If no foam forms – pour or pipette based on volume required.

Required Protocol for AFFF and FFF (F3) Concentrates

Samples composed of AFFF or F3 will be subsampled consistently, with approximately **0.02 g of AFFF/F3 material** aliquoted for each discrete sample preparation/analysis; each AFFF or F3 concentrate sample analyzed under DoD direction **must be prepared in duplicate**. After creating and documenting the subsample aliquot, add approximately 60 mL of reagent water, cap the vessel, and shake vigorously by hand for 20-30 seconds. After adding the reagent water and agitating, allow **at least 3 hours** for the subsample aliquot to fully dissolve in the water. If dissolution is incomplete after 3 hours, agitate again and wait another 3 hours; consider applying continuous agitation (orbital shaker) if full dissolution of the aliquot into water requires extended time. Following the extended dissolution time, prepared AFFF/F3 samples should be prepared and analyzed following the routine protocols for aqueous sample processing. Aqueous reporting limits (MDL/LOD/LOQ) will be used, with values adjusted to account for the actual sample aliquot, assuming 1 g/mL; this constitutes a 25,000X nominal adjustment factor for AFFF/F3 reporting limits, relative to nominal aqueous reporting limits.

Pace **STRONGLY DISCOURAGES** clients from sending AFFF concentrate material for analysis; this protocol is designed for "as-prepared" AFFF materials (i.e. pre-diluted to application concentration) and newer generation 'Fluorine Free Foam' (F3) concentrates. If F3 material (concentrate or as-prepared) or as-prepared AFFF material is received, follow the normal routines described in the first paragraph above. If an AFFF concentrate material (usually of a thick gel-like consistency) is received for analysis, the lab shall prepare a 3% (w/w) aqueous solution from the received sample (in the smallest volume feasible) prior to subsampling and diluting 0.02 g for extraction. Handling of AFFF concentrate should ideally be done in an isolated area outside of the PFAS processing area to prevent gross lab contamination. Following the two dilution steps, the nominal adjustment factor for AFFF concentrate material is 833,333X (8.33×10^5) relative to nominal aqueous reporting limits.

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Appendix F: MS/MSD, MS/DUP SAMPLE SELECTION PROTOCOL

Project-specific requirements may include that matrix spikes (MS), matrix spike duplicates (MSD), and/or laboratory duplicates (DUP) be prepared and analyzed with project samples. The client/field team should identify those samples which are designated for these additional QC procedures and provide additional sample material for them. In the event that samples are received for such a project without additional containers for MS/MSD/DUP, prep analysts will select samples to be used for this purpose following a hierarchy of preference, as defined below.

Note: Any kind of blank (Field Blank, Trip Blank, Equipment Blank, Rinsate Blank, etc.) will not be used for MS/MSD/DUP analysis.

1) First preference is to use client-designated samples as MS/MSD samples. This designation should show up on the prep worklist, in the comments. It is possible that SR will miss adding this comment to the sample, but this designation will be present in the COC from the client, on the right side of the COC under "Comments/Remarks/Cooler ID." When a client designates a sample to be used for MS/MSD analysis, they will typically provide us with more than 2 bottles (often 4, sometimes as many as 6).

2) Lacking a client-designated MS/MSD sample, the next preference is to use any sample received with more than 2 bottles provided. If an analyst selects a set of samples for prep in which none of the samples are client-designated for MS/MSD, the analyst should check for any samples in the set that were received with 3 or more bottles. If there is a sample with 3 or more bottles, pull 3 of them and use one for the parent sample and spike the other two for analysis as MS/MSD samples.

3) Lacking any samples received with 3 or more bottles, the prep analyst must use two different parent samples to create an MS/DUP pair. Find two samples out of the set of samples selected for prep which were received with 2 bottles and pull both bottles for each sample. Pick one sample (pair of bottles) to be used for parent/MS prep and the other sample (pair of bottles) to be used for parent/DUP. The sample selected for parent/MS will have one bottle spiked with targets and one prepped as normal, with no added spiking. The bottle which is spiked should be identified in the LIMS as MS. The sample selected for parent/DUP will have both bottles prepared following normal procedures but one of the two should be identified in the LIMS as DUP.

4) If all samples in a particular prep batch were all received in just one bottle, analysis of an MS/MSD or MS/DUP pair will not be possible. This should be an uncommon occurrence, as prep analysts will attempt to adjust batching to ensure that every prep batch contains an MS/MSD or MS/DUP for projects which require the additional QC.

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Appendix G: Aqueous Sample Management Decision Guide

NOTE: No TSS pre-test will be performed on aqueous samples received for 1633 analysis.

Per Method 1633, Section 11.1.1.5, "laboratories may utilize other documented strategies for minimizing the disruptions due to SPE clogging and slow extractions." Follow the guide below to evaluate aqueous sample matrices for solid material and determine the appropriate preparation approach; a matching decision tree is included at the end of this appendix.

If potential interferences other than settled solids are observed, take action to mitigate the impacts on data quality. Examples of other sample characteristics that could lead the lab to take precautionary measures with a field sample (i.e., prepare from reduced volume) include: presence of standing foam in the sample after shaking, thick/viscous matrix, collected from a known highly contaminated site/project, client notes indicating potential high concentrations, and knowledge of potential hazards to safety, equipment performance, or process integrity due to sample composition. Consider any visible indications of particulate matter including settled solids collected on the bottom of the container, cloudiness and/or dark color of the sample, suspended solids within the sample, increased viscosity, etc. If uncertain, seek a second opinion from another analyst, supervisor, or operations director; these matrix characteristics may require reduced-volume extraction. The lab will attempt to use the largest volume possible (i.e., the smallest reduction possible) when performing a reduced-volume extraction to manage challenging matrix characteristics, and no less than 1 mL of sample will be used in this case.

1) Allow samples to sit for at least 15 minutes to allow solids in the matrix to settle to the bottom of the container.
2) Visually inspect each sample for settled solids collected in the bottom of the container and follow the appropriate protocol based on observation:
    a. If no solids are observed in the bottom of the container, proceed to step 3.
    b. If solids are observed in the bottom of the container with an approximate depth <1/2 cm (<5 mm), proceed to step 5.
    c. If solids are observed in the bottom of the container with an approximate depth >1/2 cm (>5 mm), proceed to step 7.
    d. If solids observed in the container make up approximately 5% or more of the total sample volume, proceed to step 9.

<u>No Settled Solids Observed:</u>

3) Do not take any additional action to prepare for extraction and follow routine protocols.
4) If the SPE cartridge begins to clog during sample loading (see Identifying Cartridge Clogging section below), abandon loading of the remaining sample volume and proceed to the cartridge rinsing and drying described in step 10 of Section 9.3.4.

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a. Document the inability to load the entire sample volume due to cartridge clogging. If the resulting EIS recoveries are below the method acceptance ranges, this documentation provides the rationale for re-extraction from reduced volume.

b. The sample bottle rinse described in step 12 of Section 9.3.5 must be omitted; simply add the 5 mL of 1% methanolic ammonium hydroxide directly to the reservoir/cartridge.

c. If the cartridge clog prevents the cartridge rinses or elution solvent from passing through the cartridge, document that an extract could not be collected for that sample. Submit the sample for re-extraction from reduced volume. Notify the group leader and prep team of this necessity and, based on the total volume loaded in the first extraction attempt, provide a suggested reduction factor (i.e., reduce volume 5X, 10X, 20X, etc.).

Settled Solids Depth <1/2 cm Observed:

5) Do not take any additional action to prepare for extraction and follow routine protocols; however, be aware that there is a higher probability that the SPE cartridge will clog, and care must be taken in sample loading to attempt to pass the entire sample through the sorbent.

6) If the SPE cartridge begins to clog during sample loading (see Identifying Cartridge Clogging section below), abandon loading of the remaining sample volume and proceed to the cartridge rinsing and drying described in step 10 of Section 9.3.4.

a. The sample bottle rinse described in step 12 of Section 9.3.5 must be omitted; simply add the 5 mL of 1% methanolic ammonium hydroxide directly to the reservoir/cartridge.

b. Document the inability to load the entire sample volume due to cartridge clogging. If the resulting EIS recoveries are below the method acceptance ranges, this documentation provides the rationale for re-extraction following centrifugation; however,

c. If the cartridge clog prevents the cartridge rinses or elution solvent from passing through the cartridge, document that an extract could not be collected for that sample. Submit the sample for re-extraction with sample centrifugation (See Aqueous Sample Centrifugation Protocol in Appendix H). Notify the group leader and prep team of this necessity.

i. If, in the judgment of an experienced analyst, the nature of the solids present in the sample is of a nature that would preclude successful centrifugation and decantation, the decision should be confirmed with the group supervisor and/or another experienced analyst; once confirmed, the sample is submitted for re-extraction from reduced volume. Notify the group of this necessity and, based on the total volume loaded in the first extraction attempt, provide a suggested reduction factor (i.e., reduce volume 5X, 10X, 20X, etc.).

ii. If the centrifuged sample clogs the cartridge in the second extraction, see step 6 above; if there is sufficient sample remaining for another re-extraction, submit the sample for re-extraction from reduced volume as described in (i) above. If there is not sufficient sample remaining for another re-extraction, narrate any quality exceedances and report data for all runs.

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Settled Solids Depth >1/2 cm Observed:

7) The sample will need to be centrifuged before performing SPE. Instead of following the routine sample extraction procedures, refer to Appendix H for the Aqueous Sample Centrifugation Protocol.

8) Document the decision to centrifuge the sample prior to SPE.

    a. If resulting EIS recoveries are below the method acceptance ranges, this documentation provides evidence that the results are impacted by matrix interference.

        i. Report the data with a narrative statement explaining that the results are matrix-impacted.

        ii. Alternately, submit the sample for re-extraction from reduced volume to attempt to provide data with compliant EIS recoveries.

    b. If the decanted sample clogs the SPE and prevents successful collection of the extract, document that detail and submit the sample for re-extraction from reduced volume. Notify the group of this necessity and, based on the total volume loaded in the first extraction attempt, provide a suggested reduction factor (i.e., reduce volume 5X, 10X, 20X, etc.) for the re-extraction.

Settled Solids Observed to be ≥ 5% of Total Volume:

9) Shake the sample to thoroughly homogenize it, then immediately subsample 1 mL into a pre-labeled 50mL centrifuge tube and add reagent water to approximately 40 mL. At 5% solids, a sample contains 50,000 mg/L, so 1 mL contains 50 mg of solid material.

10) Spike the diluted subsample with EIS as normal and proceed with extraction.

11) If the SPE cartridge begins to clog during sample loading (see Identifying Cartridge Clogging section below), abandon loading of the remaining sample volume and proceed to the cartridge rinsing and drying described in step 10 of Section 9.3.4.

    a. Document the inability to load the entire sample volume due to cartridge clogging.

    b. The sample bottle rinse described in step 12 of Section 9.3.5 must be omitted; simply add the 5 mL of 1% methanolic ammonium hydroxide directly to the reservoir/cartridge.

    c. If the cartridge clog prevents the cartridge rinses or elution solvent from passing through the cartridge, document that an extract could not be collected for that sample.

12) If the cartridge clogs during extraction and causes failing results, the lab will contact the client and notify them that sample extraction failed due to the nature of the matrix, and that they must decide between two options for reprocessing the sample:

    a. Apply biosolid matrix protocols, following Sections 9.3.6 through 9.3.8 of this SOP. Use 0.5 g of sample for extraction; do not submit for % solids analysis and report results as ng/g, on a wet weight basis.

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b. Attempt to separate and analyze the aqueous and solid phases separately. If the client selects this option, follow the protocol detailed in Appendix I.

Identifying Cartridge Clogging

During the loading phase of the SPE process, some samples may cause their cartridges to clog, preventing the entire sample from being loaded through, and sometimes preventing an extract from being collected. If you have a sample that slows down considerably during the loading process, you may need to abandon loading the remainder of the sample. The goal is to stop the process before the cartridge seizes up completely, so that a sample extract can still be collected from the cartridge.

When Clogs Start

Some of the first visual indications of a cartridge becoming clogged include: discoloration of the cartridge frit and/or sorbent bed, reduced drip rate of the sample through the cartridge, and coloration or sedimentation on the bottom of the reservoir.

When a cartridge starts to clog, it is important to stop the process before the cartridge seizes up completely. Take the actions listed below; an evaluation must be made to decide whether each cartridge can reasonably be used further without seizing up completely.

- Do not continue to add any more sample volume to the reservoir of the clogging cartridge.
- If there is substantial volume remaining in the reservoir (i.e., > 10 mL) and the cartridge is in apparent imminent danger of seizing completely, close the manifold port to stop sample loading. Carefully remove the cartridge-adaptor-reservoir assembly for the sample in question and pour whatever sample volume remains in the reservoir back into the original sample bottle. This volume will be included in the evaluation of extracted sample volume (initial volume).
- If the reservoir on the clogging cartridge empties before the other samples have finished loading, close the manifold port to prevent the cartridge from drying.
- If sample volume remains in any of the slowed cartridges after the loading of the other samples is finished, close all the manifold ports and focus pressure on the slowed cartridge in an attempt to load the volume remaining in the reservoir. (Do this one at a time for multiple clogs.) If the cartridge appears to be in imminent danger of seizing up completely, do not attempt to load the volume remaining in the reservoir; follow the steps in the second bullet of this section.

Abandoning Sample Loading

If the decision is made to abandon sample loading, take the following actions. Some of these are partial duplicates of the actions listed in the section above.

- If any sample remains in the reservoir, carefully remove the cartridge-adaptor-reservoir assembly for the sample in question and pour whatever sample volume remains in the reservoir back into the

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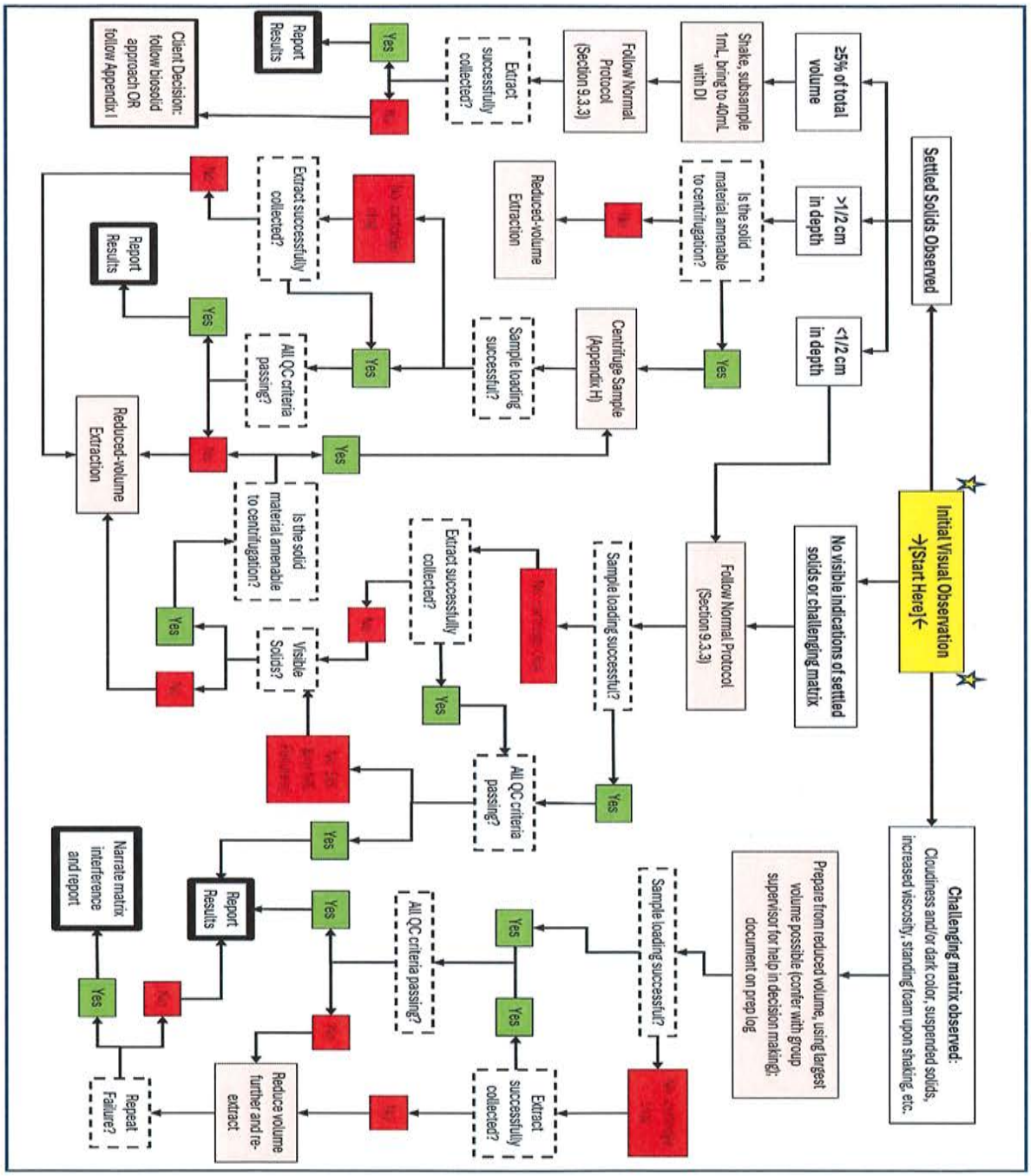
original sample bottle. This volume will be included in the evaluation of extracted sample volume (initial volume).

- Use the cartridge from the abandoned sample and finish the SPE process to collect what extract is available.
- The sample bottle rinse described in step 12 of Section 9.3.5 must be omitted; simply add the 5 mL of 1% methanolic ammonium hydroxide directly to the reservoir/cartridge.
- Weigh the sample in its original bottle to establish the "empty bottle" weight (aka post-extraction weight).

Fully Clogged Cartridges

Samples will have to be re-extracted when cartridges clog so fully that the extraction process cannot be taken to completion to collect a sample extract. Based on the total volume loaded in the failed extraction attempt, provide a suggested reduction factor for the re-extraction (i.e., reduce volume 5X, 10X, 20X, etc.) The sample should be shaken up before subsampling for the reduced volume re-extraction. However, for samples containing solids that are very fine and easily suspended, the analyst may consider allowing the sample to settle before subsampling an aliquot for reduced volume re-extraction; this may help prevent cartridge clogging in the re-extraction process.

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Appendix H: Aqueous Sample Centrifugation Protocol

Method 1633 states "laboratories may utilize other documented strategies for minimizing the disruptions due to SPE clogging and slow extractions," and "a trained analyst should be able to distinguish samples with very low TSS and focus…on only those samples that might present a risk of clogging." Therefore, whether an individual sample will require centrifugation for proper preparation will be determined and documented by the preparation analyst, following the guidance in Appendix G. Additionally, the method states "If centrifugation is used to prevent samples with high TSS from clogging the SPE, the EIS compounds must be spiked into the original sample container prior to centrifugation." This protocol complies with that dictate.

1) Follow Appendix G to evaluate the sample for the presence of solids. Inspect the sample and consider the necessity of centrifuging.

2) If the sample is determined to require centrifugation/decantation, contemporaneously make a note on the prep batch log indicating this fact.

3) Spike samples requiring centrifugation in the same manner and with the same standard volume as samples which will not be centrifuged.

4) Label a 500mL conical centrifuge bottle with the sample ID for each sample that will be centrifuged. Set them in an appropriate rack with the caps removed.

5) Vigorously shake the spiked sample and then quickly pour it into the appropriately labeled centrifuge bottle. Try to ensure that the original sample bottle is devoid of any solid material after the transfer. Be careful to avoid spilling sample during the transfer process. Tightly cap each centrifuge bottle after transfers are complete.

6) Transfer capped centrifuge bottles to the centrifuge rotor, ensuring that the carousel is symmetrically balanced. Close the top and centrifuge at 3000 RPM (~2000 RCF) for 6 minutes.

7) Remove centrifuge bottles and decant the centrifuged liquid from the condensed solids by transferring it back into the original sample bottle. Try to avoid transferring any of the condensed solids from the centrifuge bottle back to the original sample bottle, while maximizing the amount of liquid collected in the sample bottle.

8) Weigh the full, decanted original sample bottle and document in the prep batch log.

9) Extract the decanted sample as normal alongside un-centrifuged samples, through the cartridge rinsing and drying (step 10 of Section 9.3.4).

10) When the SPE cartridges have been dried, rinse the original sample bottle following the protocol in step 12 of Section 9.3.5. Additionally, add 5mL of 1% methanolic ammonium hydroxide (1%-MeOH) to each centrifuge bottle to rinse the inside of them as well as the solids they contain. If the condensed solids become re-suspended while rinsing the bottles, centrifugation may be required. Using a transfer pipet or mechanical pipet, transfer the 1%-MeOH rinse from the centrifuge bottle into the reservoir/SPE cartridge and elute with the original sample bottle rinse into a 15mL conical centrifuge tube.

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11) Add 5 mL of additional 1%-MeOH directly to the SPE reservoir of all batch QC samples (MB/LCS/LLLCS) and elute with the normal bottle rinse. This is to match the volume used for elution of centrifuged field samples in the prep batch.

12) After elution, all sample extracts (client and QC) with additional elution volume shall be concentrated to ~3.5 mL and brought to a final volume of ~4 mL with 1%-MeOH. Concentrate each extract at approximately 55 °C with N2 flow of approximately 1.2 L/min. Use a reference elution tube to reconstitute to the appropriate volume, like the protocol in step 8 of Section 9.3.6 of this SOP. This extract concentration and reconstitution must be done BEFORE adding acetic acid and NIS to the extracts, as directed in step 14 of Section 9.3.5.

13) Weigh the empty bottle with the cap on and subtract that from the weight of the bottle with sample, determined in step 8 of this appendix, to determine initial sample volume.

14) Add 25 µL of concentrated acetic acid and 20 µL of NIS mix to each sample extract in its collection tube and vortex to mix. Transfer a portion of each extract into an autosampler vial for LC-MS/MS analysis. Cap the collection tubes containing the remaining extracts and store at 0 - 6 °C.

15) Generate a narrative statement noting which samples in the prep batch included centrifugation in the extraction process. Include any additional observations and/or deficiencies that were noted during the centrifugation or extraction process, particularly if any issues were encountered during the sample loading step of the SPE process.

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Appendix I: Separation & Analysis of Liquid-Solid Biphasic Matrices

Method 1633 states "laboratories may utilize other documented strategies for minimizing the disruptions due to SPE clogging and slow extractions, including centrifuging the sample before adding the EIS and treating the supernatant aqueous phase and the solid phase as separate samples." This will be done only according to client direction or project requirement; see Appendix G for more information regarding management of solids in aqueous samples.

1) If the client has requested to have the sample separated into aqueous and solid phases for analysis, the sample must be logged into the LIMS system separately for both matrices. The resulting solid phase will be reported on a wet weight basis and will not be analyzed for percent solids (aka percent moisture).

NOTE: The LOQ for the resulting solid analysis will depend on the amount of solid material available after decanting – the lab will use ~5 g of material if available, but any reduction in available solids will result in an increase in the reported LOQ.

2) Label a 500mL conical centrifuge bottle with the sample ID for each sample that will be centrifuged. Set them in an appropriate rack with the caps removed.

3) Vigorously shake the sample and then quickly pour it into the appropriately labeled centrifuge bottle. Try to ensure that the original sample bottle is devoid of any solid material after the transfer. Be careful to avoid spilling sample during the transfer process. Tightly cap each centrifuge bottle after transfers are complete.

4) Transfer capped centrifuge bottles to the centrifuge rotor, ensuring that the carousel is symmetrically balanced. Close the top and centrifuge at 3000 RPM (~2000 RCF) for 6 minutes.

5) Remove centrifuge bottles and decant the centrifuged liquid from the condensed solids by transferring it back into the original sample bottle. Try to avoid transferring any of the condensed solids from the centrifuge bottle back to the original sample bottle, while maximizing the amount of liquid collected in the sample bottle.

6) Weigh the full, decanted original sample bottle and document in the prep batch log.

7) Extract the decanted aqueous sample as normal alongside un-centrifuged samples, starting with EIS addition.

8) Label a 50 mL centrifuge tube with the sample ID for each solid phase sample generated from phase separation. Using a wooden tongue depressor or a pre-cleaned metal scoopula, transfer the solid material from the decanted 500 mL centrifuge bottle to the labeled 50 mL tube, targeting 5 g of total sample mass. Record the sample mass transferred to the 50 mL tube – this will be the extracted sample mass used for calculations and reporting. In many cases, re-extraction will not be possible due to limited solid material.

9) Spike the collected solid material with EIS and extract as normal alongside solid samples which were not generated from phase separation.

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Appendix J: TCLP/SPLP by 1633

Clients may submit samples (solid or aqueous) for PFAS following TCLP or SPLP procedures. For solid samples, the TCLP and SPLP procedures are used to simulate the leaching of environmental contaminants over extended periods of time from a solid material into the environment. A subsample of the client's sample is weighed out and combined with a leaching solution and mechanically tumbled for a set period. Each leachate prep method (TCLP: Method 1311 or SPLP: Method 1312) employs a unique leaching solution dictated by the parent methods. After the sample has been tumbled/leached by the Organic prep department, the leachate is filtered by the Organic Prep department and delivered to the PFAS sample holding area. The PFAS department is notified by email when the leachate solutions are ready for PFAS prep. The filtered leachate solutions are prepared by the PFAS prep analysts using the 1633 aqueous prep method, at a 1:5 dilution (100 mL of leachate solution).

1) Samples requested for PFAS by SPLP/TCLP analysis will be batched and leached by the normal SPLP/TCLP procedures used by the Westborough Alpha Organic Prep department. Organic Prep will be the initial responsible party for samples analyzed for PFAS by SPLP/TCLP.

2) When the leaching process is complete, Organic Prep will collect approximately 500mL (at minimum 100mL) of the leachate solutions in clean HDPE containers provided by the Emerging Contaminants department.

3) After collecting the leachate solution, an Organic Prep analyst will filter approximately 500 mL (at minimum 100mL) of each leachate solution using a Flipmate apparatus, using normal protocols for Flipmate filtration.

4) After filtering the leachates, the Organic Prep analyst will deliver the filtrates to the Sample management department for transport to the Emerging Contaminants Department (EC) at the Alpha Mansfield Facility. Leachates will be transferred to the EC department's designated sample storage refrigerator.

5) Samples to be analyzed for PFAS following TCLP/SPLP will appear on a separate PFAS prep worklist, the title of which will contain "SPLP" or "TCLP." From these worklists, PFAS analysts will select the samples to be extracted.

6) Pour ~100 mL of filtrate solution into a pre-labeled HDPE PFAS sample bottle, using the gradations marked on the bottle as a guide. Record the actual amount of filtrate by weighing the sample bottle. LOQs for samples prepared in this way will be ~5X higher than normal Aqueous matrix LOQs.

7) Following the instructions in step 7, use the leachate blank solution (typically has sample ID L0000000-01) to prepare three bottles for use as batch QC. Volume for the leachate blank, LLLCS, and LCS will be recorded as 100 mL.

8) Label and fill a clean 125 mL HDPE bottle with ~125 mL of pre-tested reagent water for use as a typical 1633 MB sample. Volume for the 1633 MB sample will be recorded as 100 mL.

9) After preparing the diluted filtrate, filtrate batch QC, and 1633 MB bottles, follow the normal extraction steps for aqueous matrices. Each sample will be spiked with EIS as normal. The filtrate

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LLLCS and LCS will be spiked with target analytes according to the routine aqueous protocol for LLLCS and LCS target spiking.

10) Leachate batch QC (MB/LLLCS/MS/MSD) are documented in LIMS as leachate blank (MB), and LLLCS (LCS).

11) Following the SPE process, the instrumental analyst will analyze the extracts by the 1633 method, as normal.

12) After processing, reviewing, generating reports for the data, and importing the data into LIMS, the TCLP/SPLP tumble date must be input into the analytical results from the leachate logs.

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Appendix K: Surface Wipe PFAS Analysis by 1633

Clients may submit wipe samples for PFAS analysis by 1633; wipes can be used as a proxy measurement of surface contamination in production facilities, labs, etc. The lab provides sampling kits for users which consist of a 50 mL centrifuge tube paired with a packaged ghost wipe for each surface to be sampled (ghost wipes: Environmental Express Part# SC5000). The wipe is used to swab a defined area of the surface or item of interest and is placed in the accompanying centrifuge tube, which is then capped, labeled, and shipped back to the lab for preparation and analysis.

Used wipe samples are prepared directly in the container in which they are received, following the protocols for solid matrices described in Sections 9.3.6 through 9.3.8; analysis follows normal 1633 routines. No correction will be made for percent solids, and results are reported as ng/wipe.

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Appendix L: Articles of Commerce Analysis via Cryomill Processing

Clients may submit samples of various consumer product materials and 'articles of commerce' for analysis of PFAS contained in the products. To effectively mobilize any PFAS that may be present within the structure of the material, samples must be milled to a fine powder using a cryogenic mill (or Cryomill).

This appendix provides strategies for processing samples obtained from an article of commerce. Common techniques are covered for mechanical size reduction of articles and their sub-units or portions thereof prior to the determination of PFAS in the article or article components via extraction and quantitative analysis. Polymer powders, nanomaterials, fibers, pastes, fluorinated ionomers etc. may not require size reduction if they are known to be sufficiently homogenous and more than 95% of the material passes a 250 µm sieve. Examples of common articles requiring milling prior to extraction and analysis are compacted cakes, melt extruded pellets and molded articles, elastomers and agglomerates, coated wire, textiles, paper, leather, food, and LDPE and polypropylene.

The user shall elect to apply one or more of the approaches, or compendium of approaches, to create homogenous samples suitable for extraction and analysis. Selection of the appropriate technique(s) depends on the article. Alternative methods of mechanical sample preparation can be used, provided that the required particle size (avg. particle size approx. 100 µm) of the sample is achieved without contaminating or compromising the sample.

Sample Processing Equipment and Materials

The following sample processing equipment and materials are required, subject to the type of material being prepared. Conditions for cryogenic fine milling are provided for the Retsch CryoMill, however, alternative cryomilling equipment like the SPEX ® Freezer/Mill may be used for most products.

1) Scissors, heavy plate shears or RetschTM ZM 200 Grinding Mill (Centrifugal Mill) with 6 or 12 tooth stainless steel (SS) rotor and 1 mm stainless steel bottom sieve.
2) Retsch CryoMill (Ball Mill), with SS grinding cartridge and 25 mm grinding ball (50 mL grinding cartridge, 5 g fill), or equivalent cryogenic mill capable of grinding to approximately 100 µm particles.
3) Cleaning brushes (different sizes) and polishing cloths, or cotton balls/swabs
4) Liquid nitrogen (LN2)
5) High purity methanol and ASTM Type I water for cleaning mill parts
6) Ventilated hood, to minimize exposure to fine particles/dusts/aerosols and chemical vapors
7) Ventilated drying oven capable of > 200°C
8) Precision sieves and accessories, nickel mesh, 50 µm and 150 µm sizes

Manual Cutting

If possible, manual cutting with pre-cleaned shears or scissors is suitable for rough cutting and preparation of samples for further reduction by grinding, etc. Recommended maximum sample size is 10

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x 10 mm but will depend on the specification of the equipment used in the subsequent preparation processes.

Fine Grinding by Cryomill

Fine grinding via cryomill is suitable for further mechanical breakdown of samples, grinding material to pieces ~100 µm in diameter. Be careful not to allow the LN2 to come into direct contact with the sample to prevent spattering and sample loss. Thorough cleaning of the mill components between samples is crucial to avoid cross-contamination; see steps 7-11 below for details.

Cryomilling will be performed using a Retsch CryoMill (ball mill) with automatic LN2 feed, as described below:

Sample Type[1]	Cycles	Preset	Frequency (Hz)	PCT (minutes)	MT (minutes)	ICT (minutes)
Elastomers (FKM, FFKM, FEPM, and agglomerates)	1	1	30	Auto	2	NA
Compacted Cake	5	NA	30	Auto	2	2
Melt Extruded Pellets and Molded Articles	7	2	30	Auto	4	2
Coated Wire	3	3	30	Auto	2	2
Textiles, Paper, Leather	3	4	25	10	2.5	0
Food (meat, cheese)	1	5	25	8	2	NA
LDPE and PP	2	6	25	10	2	2

[1] *In most applications, a feed mass of 5 g is used.*
PCT: Precooling time (automatic set)
MT: Milling time
ICT: In-between cooling time

1) In the case of FFKM compounds and articles, care must be taken to avoid excessive energy input as it may lead to cryo-mechanical degradation of the polymer and the creation of mechanoradicals, which can inflate the amount of target substance detected. Filling levels will impact the energy applied in the grinding process and can inflate test results as well.

2) In the case of cured FFKM elastomeric articles, pulverizing the product in a 2-roll mill as commonly used for compounding of elastomers can be an alternate sample preparation method to avoid or reduce the risk of mechanical degradation. Alternative methods for FFKM compounds and articles that do not require cryo-grinding are being investigated.

3) Cryogenically mill the sample powder and sweep out the milled material to collect all the powder. The collected plastic-based sample material should be precision sieved to obtain a sufficiently homogeneous portion of known particle size range of 50 µm to 150 µm, by first sieving material

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through the 150 µm sieve, then the 50 µm sieve (keep contents captured on 50 µm sieve). Size range is 100 + 50 µm (i.e. ~ 100 µm).

4) The collected FKM-, FFKM- and FEPM-based samples are visually inspected for homogenous size, verification via light-scattering is beneficial. Sieving of the samples is not recommended due to materials' elastomeric nature and the potential for particles to re-agglomerate into larger segments over time.

NOTE: Freshly cryomilled samples should either be extracted ASAP (same day) OR placed under frozen conditions (-10° C) ASAP and held under frozen conditions until ready to extract.

5) Make sure to follow the User Manual for installing and removing the grinding jar. This includes the two lock rings on the left side of the mechanism.
    a. Make sure outer LOCK RINGS are loosened.
    b. Screw in the grinding jar (from the right side of the mechanism). Tighten with black plastic tightening aid.
    c. TIGHTEN TWO LOCK RINGS: Outside ring tightened first (hand-tighten only); inner ring tightened second (snug), using the tool.
    d. Perform grinding cycle.
    e. LOOSEN THOSE TWO LOCK RINGS: Inside ring loosened first, outer ring loosened second. To loosen either ring, the tool will be needed because of icing.
    f. Unscrew grinding jar.
    g. When cryomill is not in use, make sure to replace the cooling jacket seal.
6) For extraction of cryomilled materials, follow the solid matrix extraction protocol listed in Sections 9.3.6-9.3.8, using 2 g as the target sample mass instead of 5 g. Sample results will be reported as ng/g, with no moisture correction.

Cleaning Procedure for Mill Components

Thorough cleaning of the mill components between samples is crucial to avoid cross-contamination. The following cleaning procedure is recommended.

7) Remove residual polymer thoroughly with DI water and brush.
8) If necessary, wipe away last polymer residue with clean polish cloth or cotton ball/swab.
9) Rinse all parts with methanol, use an ultrasonic bath as needed.
10) Rinse all parts with DI Water, use an ultrasonic bath as needed.
11) Repeat steps 7-10 as needed.

Analysis and Holding Time

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Matrix	Routine Container	Minimum Sample Amount	Preservation	Holding Time
Fluoropolymers, molded articles, coated wire, pellets, or other Articles of Commerce[1]	Any container or packaging that does not contain PFAS. Target container is a 125 mL PFAS container; however, clients will often send in Ziploc bags or other packaging.	5 g (target weight for clients to send is 20 g).	Can be shipped at any temperature (being an Article of Commerce). Once received in the lab: <6°C (prior to cryomill) Once cryomilled: Frozen Extract storage: <6°C	Sample receipt (or dated collected)[2] to cryomill: 1 year From cryomilling to extraction: 14 days Once extracted: 30 days

[1] *Almost any "solid" material is applicable to this approach, as long as it can be manually coarse cut to approximately 5-10 mm in size (half a pea). If the matrix is soft (e.g., gummy bear), a larger feed size can be used.*

[2] *Often clients do not include "date collected." If none provided, "date collected" becomes "date received."*

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Appendix M: Procedure for Total Oxidizable Precursors (TOP)

The following modifications to the referenced SOP are as follows:

Section 7: Water Bath – Capable of monitoring recording to .1 C maintaining 85 C.

Section 8.1: Sodium Hydroxide (NaOH, CAS#: 1310-73-2) – High purity, demonstrated to be free of analytes and interferences.

Potassium Persulfate ($K_2S_2O_8$, CAS#: 7727-21-1) - High purity, demonstrated to be free of analytes and interferences.

Hydrochloric Acid (HCl, CAS#: 7647-01-0) - High purity, demonstrated to be free of analytes and interferences.

Additional table to be added to Section 8

Table 1

Isotope Labeled Standard	Conc. Top Surr Stock (ng/mL)	Vol. of Top Surr Stock (µl)	Final Vol. of Top Surr PDS (mL)	Final Conc. of Top Surr PDS (ng/mL)
$^{13}C_2$-PFOA	50,000	40	4.0	500
$^{13}C_2D_4$-4:2FTS	50,000	80	4.0	1000

For Aqueous samples, prior to Section 10 of SOP 45852, add to each 125 ml sample with Potassium Persulfate until 60 mM (about 2 grams). Add Sodium Hydroxide until the sample is 125 mM (about .625 grams).

Sample should have a pH >12.

Fortify each sample with 20 µl of TOP pre-assay surrogate containing 1 negative control surrogates and 1 positive control surrogates from table 1.

Place sample in a water bath at 85 C for 6 hours.

Remove sample from water bath and adjust pH 6-8 with Hydrochloric Acid.

Following pre-treatment, follow the aqueous extraction protocol from section 10 of SOP 45852 unaltered.

Section 11, An additional calculation is added for the final reporting of the TOP assay results.

TOP Assay = Result of Post TOP assay extraction – Result of analysis from Pre-Top Assay extraction.

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CASTLETON ENVIRONMENTAL

APPENDIX D

LIST OF PFAS FOR ANALYSIS UNDER EPA METHOD 1633

70 West Main Street, Babylon, NY 11702
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Analyte Abbreviation	CAS #	Aqueous (ng/L)		Leachate (ng/L)	
		DL	LOQ	DL	LOQ
PFBA	375-73-5	0.527	6.4	2.64	32
PFPeA	2706-91-4	0.359	3.2	1.79	16
PFHxA	355-46-4	0.245	1.6	1.22	8
PFHpA	375-92-8	0.238	1.6	1.19	8
PFOA	1763-23-1	0.263	1.6	1.31	8
PFNA	68259-12-1	0.266	1.6	1.33	8
PFDA	335-77-3	0.210	1.6	1.05	8
PFUnA	79780-39-5	0.178	1.6	0.892	8
PFDoA	375-73-5	0.214	1.6	1.07	8
PFTrDA	2706-91-4	0.187	1.6	0.934	8
PFTeDA	355-46-4	0.160	1.6	0.801	8
PFBS	375-73-5	0.402	1.6	2.01	8
PFPeS	2706-91-4	0.206	1.6	1.03	8
PFHxS	355-46-4	0.133	1.6	0.665	8
PFHpS	375-92-8	0.201	1.6	1.00	8
PFOS	1763-23-1	0.264	1.6	1.32	8
PFNS	68259-12-1	0.203	1.6	1.02	8
PFDS	335-77-3	0.140	1.6	0.699	8
PFDoS	79780-39-5	0.242	1.6	1.21	8
4:2 FTS	757124-72-4	0.910	6.4	4.55	32
6:2 FTS	27619-97-2	4.82	6.4	24.1	32
8:2 FTS	39108-34-4	1.22	6.4	6.11	32
PFOSA	754-91-6	0.097	1.6	.484	8
NMeFOSA	31506-32-8	0.226	1.6	1.13	8
NEtFOSA	4151-50-2	0.351	1.6	1.76	8
NMeFOSAA	2355-31-9	0.483	1.6	2.41	8
NEtFOSAA	2991-50-6	0.478	1.6	2.39	8
NMeFOSE	24448-09-7	1.30	16	6.52	80
NEtFOSE	1691-99-2	1.10	16	5.50	80
HFPO-DA	13252-13-6	1.60	6.4	8.02	32
ADONA	919005-14-4	0.376	6.4	1.88	32
PFMPA	377-73-1	0.244	3.2	1.22	16
PFMBA	863090-89-5	0.360	3.2	1.80	16
NFDHA	151772-58-6	0.541	3.2	2.71	16
9Cl-PF3ONS	756426-58-1	0.442	6.4	2.21	32
11Cl-PF3OUdS	763051-92-9	0.447	6.4	2.23	32
PFEESA	113507-82-7	0.330	3.2	1.65	16
3:3 FTCA	356-02-5	0.535	8	2.68	40
5:3 FTCA	914637-49-3	4.26	40	21.3	200
7:3 FTCA	812-70-4	3.18	40	15.9	200

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APPENDIX B
GEOPHYSICAL SURVEY REPORT AND MAP

70 West Main Street, Babylon, NY 11702
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www.castletonenv.com

501 Cambria Avenue, Suite 281, Bensalem, PA 19020
215-366-7389
eastcoastgeophysics.com

Date:
4-21-2025

Site Location:
655-671 Stanley Avenue, Brooklyn, New York

Attention:
Castleton
70 West Main Street, Babylon, New York

Regards:
Michael Mesaros
East Coast Geophysics Inc.
501 Cambria Avenue Suite 281, Bensalem, Pennsylvania, 19020

1. BACKGROUND AND PROJECT OBJECTIVES

On March 25 and 26th, 2025 East Coast Geophysics personnel performed a limited geophysical investigation at 655-671 Stanley Avenue in Brooklyn, New York. The property consists of a 1-story commercial building with a full basement. Surface conditions throughout the site were asphalt and concrete. Site project objectives are:

- Locate all detectable underground utilities adjacent to the client proposed sample locations. Proposed samples were located in the sidewalk along Stanley Avenue and within the basement of the building.
- Determine the discharge point of the sanitary sewer lines in the basement of the building.

2. EQUIPMENT

This project used the following equipment to perform the geophysical survey on the property.

- *GSSI SIR-3000 Cart Mounted Ground Penetrating Radar System*

Ground Penetrating Radar is a non-invasive geophysical method in which electromagnetic pulses probe the subsurface, allowing targets to be imaged in real time. The EM pulses that are transmitted into the subsurface are reflected from various interfaces within the ground, including soil horizons, ground water, and manmade features such as underground storage tanks and utilities. The GPR antenna consists of a transmitter, which is used to create the EM pulse, and a receiver which collects returning signals. The high frequency waves created by the antenna can be generated in a range of 10 MHz to 2.6 GHz. The frequency of the antenna will vary the depth of penetrations, signal clarity, and attenuation into the subsurface. The antenna used for general field work by ECG is 400 MHz; this frequency range has the capability to transmit to a depth of up to 10 feet below ground surface. Surface and subsurface conditions can greatly reduce the effective depth of the signal penetration; these conditions include conductive soils, slag/fill material and standing water.

- *Radiodetection RD7000+*

RD7000 is an advanced high-range precision utility detector capable of detecting utilities up to 15 feet below ground surface. The RD7000+ has the capability of locating a variety of pipes and cables using either passive or active modes. **Passive** signals can be traced with only the transmitter using "natural" signals present in many conductors. These signals can be generated from an array of sources including power cables, power system return currents, and long wave radio frequencies. **Active** signals are known AC frequencies induced onto a target pipe or cable. User induced signals can help positively identify lines throughout areas of congested utilities.

- *Fisher TW-6 Pipe and Cable Locator*

The Fisher TW-6 Pipe and cable locator uses electromagnetic induction to locate conductive materials, such as manholes, tanks, pipes, cables, and other metallic materials in the subsurface. The transmitter generates an AC current which produces an electromagnetic field similar to a dipole magnet. When the transmitter passes over a conductive feature, the

generated electromagnetic field becomes distorted as a result of the interference with the natural electromagnetic field created by the conductive feature. The distortion of the generated field is detected by the receiver which emits a tone that is correlated to the conductivity of the feature.

3. PROCEDURE

ECG personnel began with a utility survey utilizing active detection with the RD-7000+. This is done by directing hooking up to known surface features across the site such as lamp posts, electric / communication boxes, and valves. The surveyor then performed a passive scan with the RD-7000+ receiver to detect any energized utilities that may have not been located with the active scan. Any detected utilities were then marked in the field.

ECG personnel then walked across the survey area with the TW-6 in 3-5 foot spacing increments. The approximate size and shape of any conductive targets detected was then marked in white and will be further investigated with GPR.

GPR was then utilized to confirm the approximate depth of any utilities detected with the RD-7000+ and the size, shape, and depth of any anomalies located with the TW-6. ECG personnel then scanned the remaining portions of the property in 3-5 foot spacing increments for any other anomalous features or utilities not detected with the RD-7000+ or TW-6.

4. RESULTS

- Underground Utilities – All utilities were marked in APWA designated colors.
    - Electric (Red) – 2-3’ bgs
    - Telecommunication (Orange) 2-3’ bgs
    - Water (Blue) – 4-5’ bgs
    - Natural Gas (Yellow) – 2-3’ bgs
    - Sanitary Sewer (Green) - 1-10’ bgs
    - Storm Sewer (Green) - 1’ bgs
    - Unknown (Pink)

- Metallic Anomalies / UST’s – No metallic anomalies consistent with UST’s were detected within close proximity to the client proposed sample locations.

- Roof Drains – The roof drains located along the north side of the building discharge into the two drywells located in the asphalt lot.

- Sanitary Sewer – The sanitary sewer traverses throughout the floor of the basement from west to east to a sewer pit located in the Tex Chicken and Burgers unit. The sewer then traverses north and east and discharges to the sewer manhole located in Hendrix Street.

A site map (042625) is attached portraying all detected subsurface features.

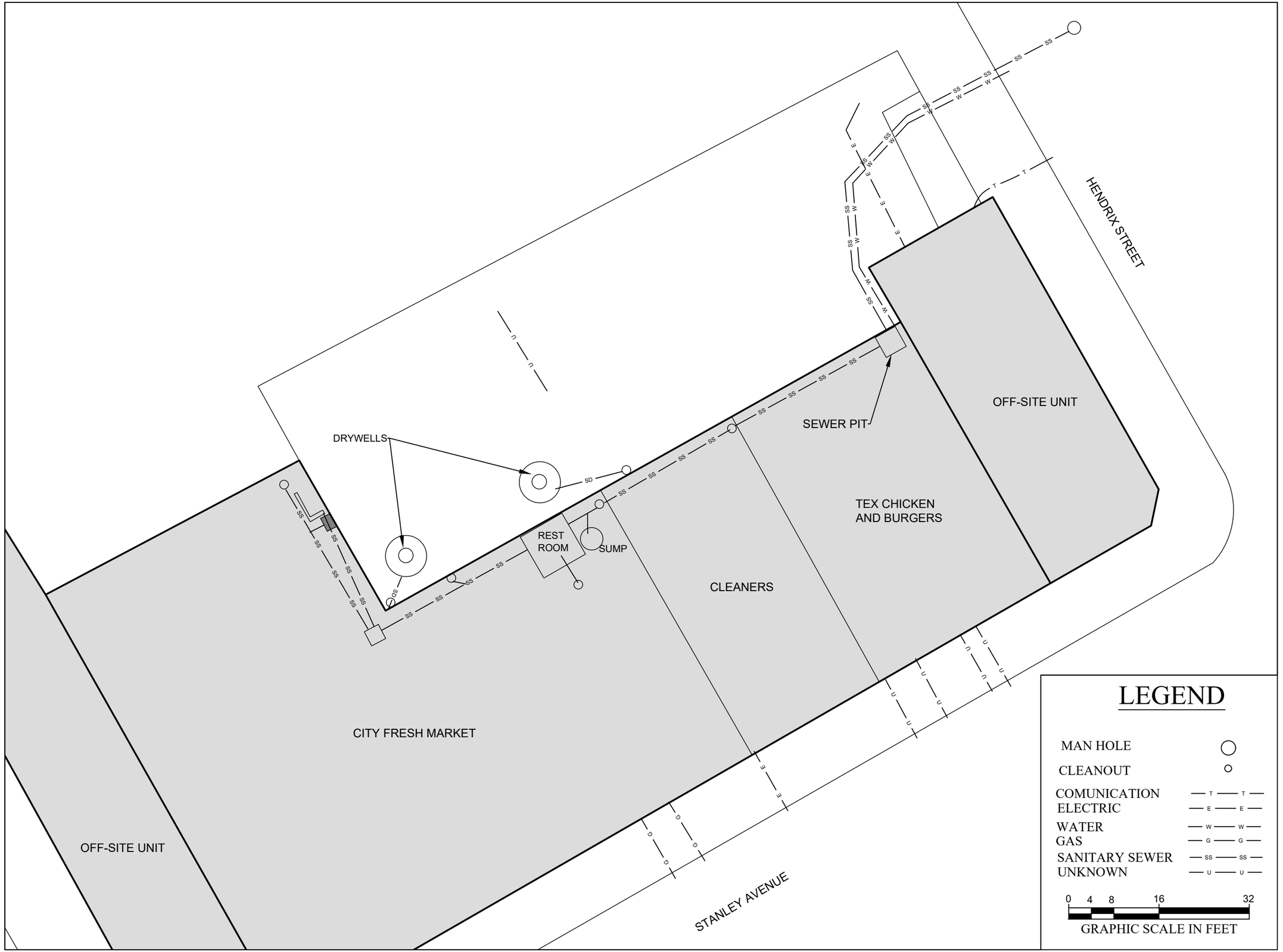
5. SITE LIMITATIONS

- Ground Penetrating Radar – GPR depth of penetration was limited to 2-3 feet bgs. The limiting factor was signal attenuation from near surface soils.

- Only areas adjacent to client proposed soil borings were surveyed for utilities and anomalous features.

6. DISCLAIMER

The limitations of a geophysical survey from both the site and equipment are important to consider when performing intrusive work at a survey site. The equipment is unable to maintain a constant depth of penetration or a constant level of effectiveness over the course of a survey due to subsurface and environmental conditions. The results provided both in this report and in the field should be used in conjunction with other methods including but not limited to, site plans, as-builts, sanborn maps, field observations, public-mark out services, soft-digging, pre-clearing, and historical documentation of the site. No survey or survey method can accurately show an exact image of all subsurface conditions. The presence of non-detectable subsurface utilities and structures is always a risk at any site. Please take caution when proceeding with invasive work.



LEGEND

- MAN HOLE
- CLEANOUT
- COMUNICATION
- ELECTRIC
- WATER
- GAS
- SANITARY SEWER
- UNKNOWN

0 4 8 16 32

GRAPHIC SCALE IN FEET

EAST COAST GEOPHYSICS, INC.

SITE

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

CLIENT

CASTLETON

DRAWING NO.

032625

PROJECT NO.

SHEET NO.

1 OF 1

SCALE

1" : 16'

DATE

03/26/2025

DRAWN

M. MESAROS

N

NOTES:

East Coast Geophysics, Inc. shall not be liable for damages of any kind arising out of the use of this information. Drawings are georeferenced based on satellite imagery and are not considered to be survey quality. These drawings are intended to be used as reference only.

APPENDIX C
COMMUNITY AIR MONITORING PROGRAM DATA

70 West Main Street, Babylon, NY 11702
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www.castletonenv.com

COMMUNITY AIR MONITORING DATA
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 3/31/2025
STAFF: JOHN ZATOR
WEATHER: 59°F, WIND 10 MPH SOUTH, OVERCAST

TIME	UPWIND	UPWIND	DOWNWIND	DOWNWIND
	DUSTRAK (19590)	PID (21575)	DUSTRAK (39984)	PID (21575)
09:05	0.080	0.00	0.066	0.00
09:20	0.045	0.00	0.034	0.00
09:35	0.029	0.00	0.047	0.00
09:50	0.025	0.00	0.019	0.00
10:05	0.026	0.00	0.034	0.00
10:20	0.098	0.00	0.026	0.00
10:35	BREAK			
10:50	BREAK			
11:05	0.098	0.00	0.013	0.00
11:20	0.021	0.00	0.022	0.00
11:35	0.018	0.00	0.010	0.00
11:50	BREAK			
12:20	BREAK			
12:35	BREAK			
12:50	0.017	0.00	0.018	0.00
13:05	0.037	0.00	0.018	0.00

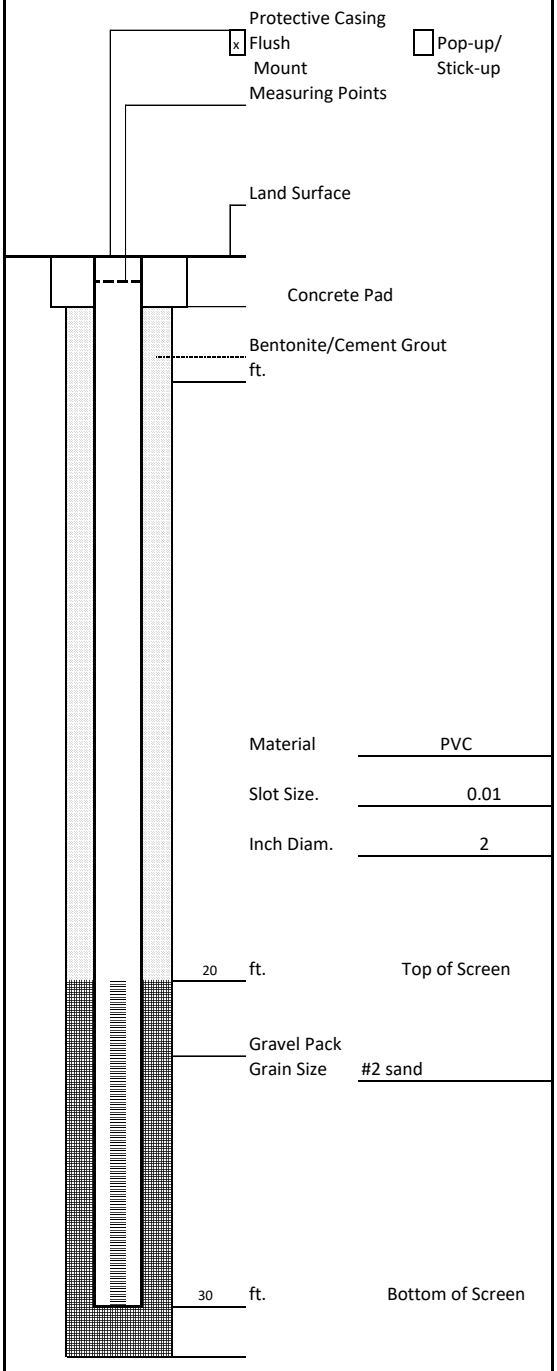
APPENDIX D
MONITORING WELL CONSTRUCTION LOGS

70 West Main Street, Babylon, NY 11702
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CASTLETON ENVIRONMENTAL

Monitoring Well

Construction Log



Material: PVC

Slot Size.: 0.01

Inch Diam.: 2

Grain Size: #2 sand

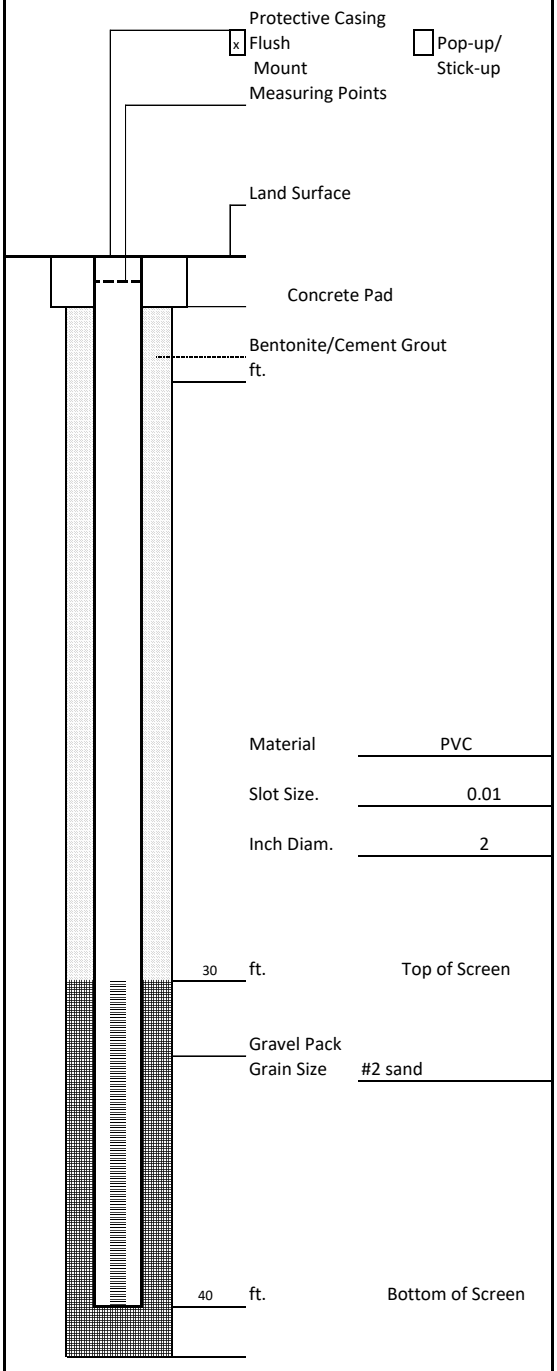
Not Drawing is not to scale.
Depths are given in feet below land surface.

Well No.	MW02-I
Project No.	ZDEZ2403
Site Address	655-671 STANLEY AVE, BROOKLYN, NY
Well Installation Date	3/31/2025
Hydrogeologist	J.ZATOR
Drilling Company Name	PAL
Surveyor	PERFECT POINT
Measuring Point Elevation (Top of Casing)	12.99
Well Purpose	MONITORING WELL
Notes	

CASTLETON ENVIRONMENTAL

Monitoring Well

Construction Log



Material: PVC

Slot Size.: 0.01

Inch Diam.: 2

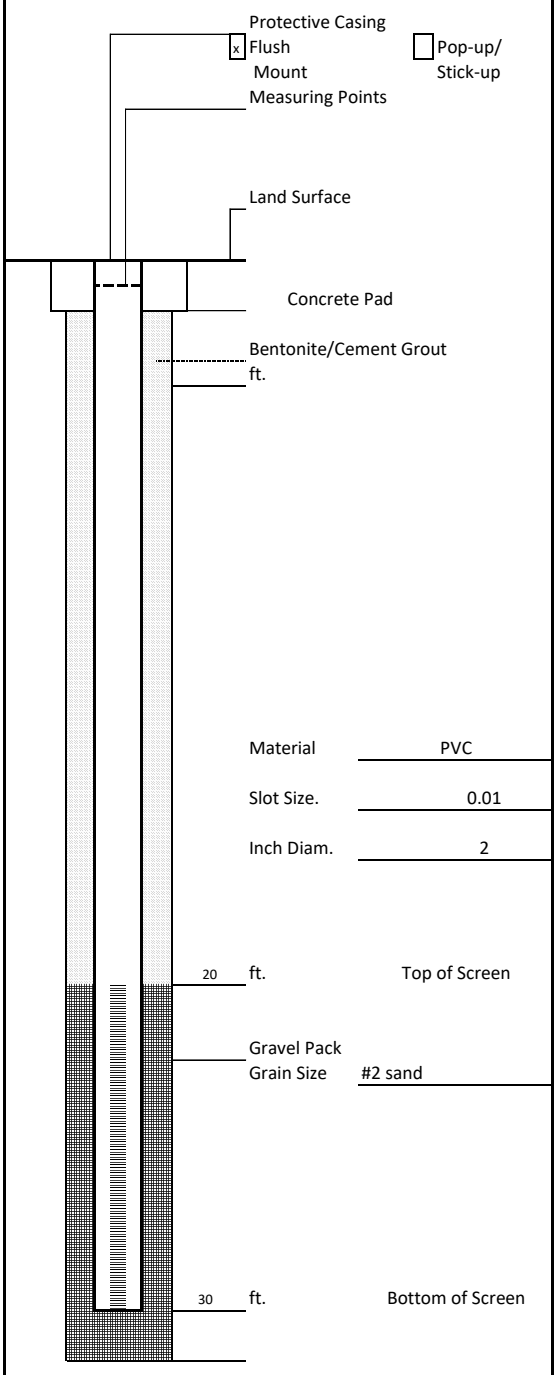
Not Drawing is not to scale.
Depths are given in feet below land surface.

Well No.	MW01-D
Project No.	ZDEZ2403
Site Address	655-671 STANLEY AVE, BROOKLYN, NY
Well Installation Date	3/31/2025
Hydrogeologist	J.ZATOR
Drilling Company Name	PAL
Surveyor	PERFECT POINT
Measuring Point Elevation (Top of Casing)	13.17
Well Purpose	MONITORING WELL
Notes	

CASTLETON ENVIRONMENTAL

Monitoring Well

Construction Log



Material: PVC

Slot Size.: 0.01

Inch Diam.: 2

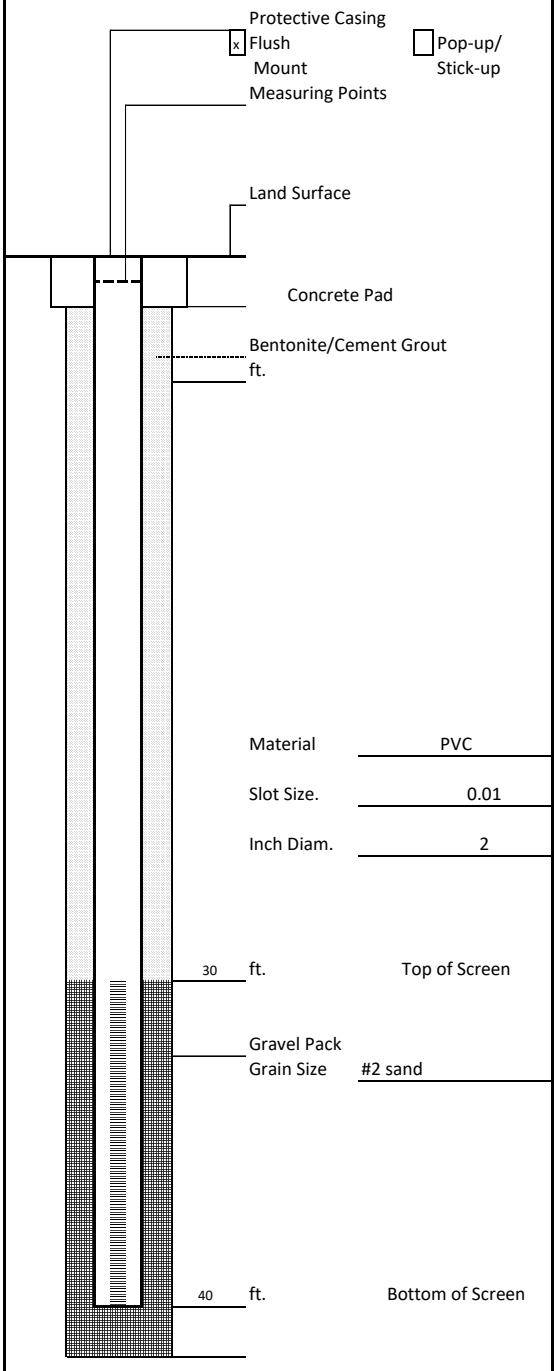
Not Drawing is not to scale.
Depths are given in feet below land surface.

Well No.	MW01-I
Project No.	ZDEZ2403
Site Address	655-671 STANLEY AVE, BROOKLYN, NY
Well Installation Date	3/31/2025
Hydrogeologist	J.ZATOR
Drilling Company Name	PAL
Surveyor	PERFECT POINT
Measuring Point Elevation (Top of Casing)	13.06
Well Purpose	MONITORING WELL
Notes	

CASTLETON ENVIRONMENTAL

Monitoring Well

Construction Log



Material: PVC

Slot Size.: 0.01

Inch Diam.: 2

Not Drawing is not to scale.
Depths are given in feet below land surface.

Well No.	MW02-D
Project No.	ZDEZ2403
Site Address	655-671 STANLEY AVE, BROOKLYN, NY
Well Installation Date	3/31/2025
Hydrogeologist	J.ZATOR
Drilling Company Name	PAL
Surveyor	PERFECT POINT
Measuring Point Elevation (Top of Casing)	13.43
Well Purpose	MONITORING WELL
Notes	

APPENDIX E
FIELD SAMPLING FORMS

70 West Main Street, Babylon, NY 11702
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www.castletonenv.com

CASTLETON WELL DEVELOPMENT FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE:4/1/2025
STAFF:J. Ferngren
MONITORING WELL: MW01-I

DEPTH TO PRODUCT:No product
DEPTH TO WATER: 10.28
DEPTH TO BOTTOM: 29.50
PUMP INTAKE DEPTH: 27 feet bgs
PURGING DEVICE:submersible pump

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (gallons)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
11:40	10.65		0						>500	No readings due to high turbidity
11:53	10.65		5						>500	No readings due to high turbidity
12:06	10.65		10						>500	No readings due to high turbidity
12:19	10.65		15						>500	No readings due to high turbidity
										Pump Stopped
12:45	10.65		20						>500	No readings due to high turbidity
13:00	10.65		25						>500	No readings due to high turbidity
13:15	10.65		30	15.57	1.24	10.31	-130	0.00	50.1	
13:30	10.65		35	15.56	1.24	10.09	-136	0.00	28.9	
13:45	10.65		40	15.55	1.25	10.05	-137	0.00	23.7	

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON WELL DEVELOPMENT FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE:4/1/2025
STAFF:J. Ferngren
MONITORING WELL: MW01-D

DEPTH TO PRODUCT:No product
DEPTH TO WATER: 10.35
DEPTH TO BOTTOM: 39.30
PUMP INTAKE DEPTH: 37 feet bgs
PURGING DEVICE:submersible pump

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (gallons)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
11:15	10.35		0						>500	No readings due to high turbidity
11:30	10.35		5						>500	No readings due to high turbidity
11:45	10.35		10						>500	No readings due to high turbidity
12:00	10.35		15						>500	No readings due to high turbidity
12:15	10.35		20	15.69	1.25	6.63	-8.4	0.69	50.48	
12:30	10.35		25	16.03	1.24	6.53	-118	0.00	45.6	
12:45	10.35		30	16.02	1.24	6.51	-122	0.00	23.2	
13:00	10.35		35	16.03	1.24	6.51	-144	0.00	18.3	

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON WELL DEVELOPMENT FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE:4/1/2025
STAFF:J. Ferngren
MONITORING WELL: MW02-I

DEPTH TO PRODUCT:No product
DEPTH TO WATER: 10.61
DEPTH TO BOTTOM: 29.85
PUMP INTAKE DEPTH: 37 feet bgs
PURGING DEVICE:submersible pump

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (gallons)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
12:49	10.61		0						>500	No readings due to high turbidity
13:04	10.61		5						>500	No readings due to high turbidity
13:19	10.61		10						>500	No readings due to high turbidity
13:29	10.61		15						>500	No readings due to high turbidity
13:39	10.61		20	15.71	1.14	10.30	-144	0.00	22.3	
13:49	10.61		25	15.79	1.13	10.03	-157	0.00	13.9	
13:59	10.61		30	15	1.13	10	-153	0.00	5.3	

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON WELL DEVELOPMENT FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE:4/1/2025
STAFF:J. Ferngren
MONITORING WELL: MW02-D

DEPTH TO PRODUCT:No product
DEPTH TO WATER: 10.65
DEPTH TO BOTTOM: 39.00
PUMP INTAKE DEPTH: 37 feet bgs
PURGING DEVICE:submersible pump

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (gallons)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
9:35	10.65		0						>500	No readings due to high turbidity
9:50	10.65		5						>500	No readings due to high turbidity
10:08	10.65		10						>500	No readings due to high turbidity
10:22	10.65		15						>500	No readings due to high turbidity
10:34	10.65		20						>500	No readings due to high turbidity
10:39	10.65		23	15.49	1.31	6.02	-64	1.46	179	
10:45	10.65		27	16.01	1.31	6.37	-107	0.07	146	
10:53	10.65		30	16.06	1.30	6.53	-110	0.00	46.7	
10:59	10.65		33	16.00	1.30	6.48	-110	0.00	24.7	
11:06	10.65		36	16.00	1.30	6.50	-110	0.00	20.2	

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: Joseph Gavin
MONITORING WELL: **MW01**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.46 ft
DEPTH TO BOTTOM (from top of casing) : 16.85 ft
PUMP INTAKE DEPTH (from top of casing): 14 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 4.0 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
09:15	10.65	200	0	10.38	0.404	6.29	313	2.54	0.7	
09:20	10.58	200	1	10.92	0.387	6.35	302	0.33	0.5	
09:58	10.51	200	4.5	11.4	0.501	6.86	254	3.33	0.4	
10:03	10.53	200	5.25	11.00	0.514	6.76	249	0.33	0.4	
10:08	10.55	200	6	10.74	0.519	6.77	245	0.332	0.2	
10:13	10.55	200	6.75	10.67	0.521	6.88	241	0.334	0.1	
10:18	10.55	200	7.5	10.75	0.500	6.84	240	0.336	0.2	
10:25										Sample Time - Duplicate Sample Collected

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/8/2025
STAFF: John Zator
MONITORING WELL: **MW01-I**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.10 ft
DEPTH TO BOTTOM (from top of casing) : 29.36 ft
PUMP INTAKE DEPTH (from top of casing): 27.50 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 4.1 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
10:01	10.10	200	0							Stablize turbidity before reading with horiba
10:11	10.13	200	2.5	14.19	1.14	7.27	54	0.00	1.00	
10:16	10.11	200	3.5	14.42	1.14	7.23	-21	0.00	0.60	
10:21	10.12	200	4.5	14.04	1.14	7.23	-25	0.00	0.60	
10:26	10.11	200	5.5	14.94	1.13	7.24	-25	0.00	0.50	
10:31	10.11	200	6.5	15.24	1.13	7.24	-24	0.00	0.50	
10:36	10.11	200	7.5	15.61	1.13	7.25	-21	0.00	0.3	
10:40										SAMPLE TIME

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/8/2025
STAFF: John Zator
MONITORING WELL: **MW01-D**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.24 ft
DEPTH TO BOTTOM (from top of casing) : 39.61 ft
PUMP INTAKE DEPTH (from top of casing): 37.50 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 2.5 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
08.32	10.24	200	0							Stablize turbidity before reading with horiba
08:42	10.25	200	2.5	9.01	1.30	6.7	111	1.01	2.10	
08:47	10.26	200	3.5	9.45	1.31	7.16	-17	0.00	1.40	
08:52	10.25	200	4.5	9.95	1.30	7.26	-45	0.00	1.20	
08:57	10.25	200	5.5	10.47	1.30	7.35	-61	0.00	0.80	
09:02	10.25	200	6.5	19.45	1.28	7.42	-71	0.00	0.50	
09:07	10.25	200	7.5	11.53	1.26	7.54	-75	0.00	0.3	
09:10										SAMPLE TIME

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: John Zator
MONITORING WELL: **MW02**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.43 ft
DEPTH TO BOTTOM (from top of casing) : 17.69 ft
PUMP INTAKE DEPTH (from top of casing): 15 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 2.9 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
09:00	10.43	200	0							Stablize turbidity before reading with horiba
09:06	10.46	200	1	8.33	0.831	7.23	248	1.96	1.2	
09:11	10.46	200	2	12.11	0.753	7.28	235	0.11	0.9	
09:16	10.47	200	3	10.47	0.761	7.21	221	0.00	0.5	
09:21	10.47	200	4	10.31	0.752	7.19	213	0.00	0.3	
09:26	10.47	200	5	10.22	0.722	7.07	189	0.12	0.1	
09:31	10.47	200	6	10.24	0.716	7.01	142	0.00	0.1	
09:36	10.47	200	7	11.49	0.688	6.95	114	0.11	0.0	
09:41	10.47	200	8	11.98	0.662	6.9	116	0.35	0.0	
09:45	10.47	200	9	12.33	0.644	6.83	106	0.38	0.0	
09:50										SAMPLE TIME

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/8/2025
STAFF: Joseph Gavin
MONITORING WELL: **MW02-I**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.51 ft
DEPTH TO BOTTOM (from top of casing) : 30.75 ft
PUMP INTAKE DEPTH (from top of casing): 28 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 0.2 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
09:13	10.51	<200	0	13.54	1.12	6.27	138	0.00	0.6	
09:18	10.51	<200	0.75	12.8	1.15	6.61	67	0.00	0.5	
09:23	10.51	<200	1.5	12.87	1.16	6.11	25	0.00	0.3	
09:28	10.51	<200	2.25	13.13	1.15	6.75	10	0.00	0.2	
09:33	10.51	<200	3	14.34	1.11	6.76	1	0.00	0.2	
09:38	10.51	<200	3.75	15.16	1.09	6.77	-4	0.00	0.1	
09:43	10.51	<200	4.5	15.36	1.09	6.76	-8	0.00	0.1	
09:50										Sample Time

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/8/2025
STAFF: Joseph Gavin
MONITORING WELL: **MW02-D**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.53 ft
DEPTH TO BOTTOM (from top of casing) : 38.94 ft
PUMP INTAKE DEPTH (from top of casing): 35 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 1.8 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
10:25	10.53	200	0	17.68	1.22	7.20	-44	0.33	0.5	
10:30	10.53	200	1	17.6	1.2	7.32	-84	0.00	0.3	
10:35	10.53	<200	1.75	17.45	1.19	7.35	-111	0.00	0.2	
10:40	10.53	<200	2.5	17.35	1.19	7.40	-126	0.00	0.1	
10:45	10.53	<200	3.25	17.3	1.19	7.42	130	0.00	0.1	
10:50	10.55	<200	4	17.24	1.17	7.45	-129	0.00	0.1	
10:55										Sample Time

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: John Zator
MONITORING WELL: **MW03**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 10.30 ft
DEPTH TO BOTTOM (from top of casing) : 17.48 ft
PUMP INTAKE DEPTH (from top of casing): 15.5 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 0.0 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
12:12	10.30	200	0							Stablize turbidity before reading with horiba
12:17	10.35	200	2	8.23	0.554	10.01	177	2.63	0.7	
12:22	10.34	200	3	8.65	0.539	8.5	206	0.74	0.5	
12:27	10.34	200	4	9.1	0.537	7.82	224	0.39	0.4	
12:32	10.34	200	5	9.63	0.529	7.44	236	0.24	0.2	
12:37	10.34	200	6	9.95	0.525	7.31	241	0.15	0.2	
12:42	10.34	200	7	10.23	0.52	7.24	245	0.14	0.1	
12:47	10.34	200	8	10.41	0.516	7.22	247	0.3	0.1	
12:52	10.34	200	9	10.52	0.515	7.23	249	0.29	0.1	
12:55										SAMPLE TIME

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: Joseph Gavin
MONITORING WELL: **MW04**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 9.99 ft
DEPTH TO BOTTOM (from top of casing) : 17.65 ft
PUMP INTAKE DEPTH (from top of casing): 15.5 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 0.0 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
12:58	9.99	200	1	11.31	0.748	7.4	259	3.65	0.4	
13:03	9.99	200	2	10.88	0.783	7.47	252	0.00	0.4	
13:08	10.00	200	3	10.93	0.782	7.57	247	0.00	0.4	
13:13	10.00	200	4	11.04	0.791	7.58	243	0.00	0.4	
13:15										Sample Time

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: John Zator
MONITORING WELL: **MW05**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 2.28 ft
DEPTH TO BOTTOM (from top of casing) : 10.23 ft
PUMP INTAKE DEPTH (from top of casing): 8 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 0.0 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
13:46	2.28	<200	0							Stablize turbidity before reading with horiba
14:51	2.57	<200	0.75	11.54	1.04	7.01	41	0.00	0.0	
14:56	2.59	<200	1.5	11.28	1	7.96	45	0.00	0.0	
15:01	2.59	<200	2.25	11.5	0.975	8.06	26	0.00	0.0	
15:06	2.6	<200	3	11.44	0.939	8.11	18	0.00	0.0	
15:11	2.6	<200	3.75	11.37	0.937	8.1	21	0.00	0.0	
15:15										SAMPLE TIME

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

CASTLETON LOW-FLOW GROUNDWATER SAMPLING FORM

PROJECT: ZDEZ2403
SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
DATE: 4/7/2025
STAFF: Joseph Gavin
MONITORING WELL: **MW06**

DEPTH TO PRODUCT: No product measured
DEPTH TO WATER (from top of casing): 1.61 ft
DEPTH TO BOTTOM (from top of casing) : 3.00 ft
PUMP INTAKE DEPTH (from top of casing): 2.5 ft
PURGING DEVICE: peristaltic pump
HEADSPACE READING (initial opening): 0.0 ppm

TIME	WATER DEPTH (ft bgs)	PURGE RATE (ml/min)	CUM. VOLUME PURGED (liters)	TEMP (^{o}C)	SPEC. COND (uS/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTUs)	Comments
14:22	1.61	200	1	12.59	0.634	8.49	112	1.75	0.3	
14:27	1.61	200	2	12.58	0.675	7.83	79	0.00	0.3	
14:31	1.61	200	3	13.07	0.666	7.76	75	0.00	0.3	
14:36	1.61	200	4	13.09	0.665	7.76	72	0.00	0.3	
14:41	1.61	200	5	13.14	0.669	7.73	68	0.00	0.3	
14:45										Sample Time-MS/MSD Collected

Parameter	Stabilization Criteria
pH	± 0.1 pH units
Spec Cond.	± 3% Fs/cm
ORP	± 10 millivolts
DO	± 0.3 milligrams per liter
Turbidity	± 10% NTUs (when turbidity is greater than 10 NTUs)

Castleton Environmental - Soil Vapor Intrusion Sampling Sheet

PROJECT NUMBER : ZDEZ2403

SITE: 655-671 STANLEY AVENUE, BROOKLYN, NEW YORK

DATE: 3/26/2025

STAFF: John Zator/Jessica Ferngren

WEATHER: 8:50am -Partly Sunny, 44° F, Wind ~5mph, ~30.00" Hg /5:50 pm-Partly Cloudy, 45°F, Wind ~5mph, ~30.00" Hg

Sample ID	SC-IAQ01	SC-SSV01	SC-IAQ02	SC-SSV02	SC-IAQ03	DUP (SC-IAQ03)	SC-SSV03	SC-IAQ04	SC-SSV04	SC-OAQ01
Can ID	5308	3049	1984	1832	2004	3067	5460	3482	3120	2663
Regulator ID	01484	01401	01636	01710	02616	0120	02697	02634	0798	01365
Can Size	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter
Indoor Air (IA), Outdoor Air (OA), Sub-Slab (SS)	IA	SS	IA	SS	IA	IA	SS	IA	SS	OA
Flow Controller readout (ml/min)	10.0	10.0	10.0	10.1	10.2	9.5	10.0	10.0	10.1	10.1
Can Pressure Start ("Hg) - LAB	-29.0	-29.4	-29.4	29.0	-29.4	-29.4	-29.2	-29.0	-29.3	-29.2
Can Pressure Start ("Hg) - FIELD	-29.83	-30.36	-30.43	-30.91	-30.38	-30.58	-29.48	-30.13	-30.45	-30.68
Can Pressure End ("Hg)	-5.45	-8.09	-4.84	-4.56	-7.74	-6.06	-5.29	-4.74	-5.00	-7.14
Start Time	09:07	09:10	09:11	10:21	10:07	10:07	10:11	10:01	10:03	08:57
End Time	17:07	17:17	17:09	18:18	18:09	18:10	18:13	18:01	17:57	15:34
Temperature Start (°F) inside building	65°F	65°F	65°F	65°F	55°F	55°F	55°F	55°F	55°F	NA
Temperature End (°F) inside building	70°F	70°F	70°F	70°F	65°F	65°F	65°F	65°F	65°F	NA
Sub-Slab Sampling										
Slab Thickness (")		4"		4"			4"		4"	
Water present		No		No			No		No	
PID Readings (ppm)		0.0		0.0			0.0		0.0	
Helium in Sub-Slab Sample (ppm)		0.0		0.0			0.0		0.0	
Sampling Notes: SC-SSV02 and SC-SSV03 vapor points were adjusted based on the initial helium tests and resealed.										

Soil Vapor Intrusion - Structure Sampling Building Questionnaire Structure ID : _____

Site No. : _____ Site Name : 655-671 Stanley Ave, Brooklyn, NY

Date: 3/25/25 Time: _____

Structure Address : 655-671 Stanley Ave, Brooklyn, NY

Preparer's Name & Affiliation : John Zotor - Castleton Env.

Residential ? ☐ Yes ☑ No Owner Occupied ? ☐ Yes ☐ No Owner Interviewed ? ☐ Yes ☐ No

Commercial ? ☑ Yes ☐ No Industrial ? ☐ Yes ☐ No Mixed Uses ? ☐ Yes ☐ No

Identify all non-residential use(s) : Supermarket, Tex's Chicken Shop [redacted], former dry cleaner

Owner Name : Unidos ZR LLC Owner Phone : ( ) _____ - _____

Secondary Owner Phone : ( ) _____ - _____

Owner Address (if different) : _____

Occupant Name : _____ Occupant Phone : ( ) _____ - _____

Secondary Occupant Phone : ( ) _____ - _____

Number & Age of All Persons Residing at this Location : 0

Additional Owner/Occupant Information : —

Describe Structure (style, number floors, size) : Commercial building with basement. Total of 11,330 SF, 4 commercial units.

Approximate Year Built : 1950 Is the building Insulated? ☐ Yes ☑ No

Lowest level : ☐ Slab-on-grade ☑ Basement ☐ Crawlspace

Describe Lowest Level (finishing, use, time spent in space) : Supermarket: used for storage, unfinished. Dry Cleaner: Vacant, unfinished. Tex's Chicken: unfinished, Storage

Floor Type: ☑ Concrete Slab ☐ Dirt ☐ Mixed : _____

Floor Condition : ☐ Good (few or no cracks) ☑ Average (some cracks) ☐ Poor (broken concrete or dirt)

Sumps/Drains? ☑ Yes ☐ No Describe : [redacted] 3 Sump + 3 floor drains

Identify other floor penetrations & details : _____

Wall Construction : ☑ Concrete Block ☐ Poured Concrete ☐ Laid-Up Stone

Identify any wall penetrations : [redacted] Doors, bilco doors, boiler stack

Identify water, moisture, or seepage: location & severity (sump, cracks, stains, etc) : [redacted] Sumps, floor drain

Heating Fuel : ☐ Oil ☑ Gas ☐ Wood ☐ Electric ☐ Other : _____

Heating System : ☐ Forced Air ☑ Hot Water ☐ Other : [redacted]

Hot Water System : [redacted] Combustion ☑ Electric ☐ Boilermate ☐ Other: _____

Clothes Dryer : ☐ Electric ☐ Gas Where is dryer vented to? [redacted] N/A

If combustion occurs, describe where air is drawn from (cold air return, basement, external air, etc.) : _____

Fans & Vents (identify where fans/vents pull air from and where they vent/exhaust to) : _____

Describe factors that may affect indoor air quality (chemical use/storage, unvented heaters, smoking, workshop):

Chemical Storage

Attached garage ? ☐ Yes ☑ No Air fresheners ? ☐ Yes ☑ No

New carpet or furniture ? ☐ Yes ☑ No What/Where ? _____

Recent **painting** or **staining** ? ☐ Yes ☑ No Where ? : _____

Any **solvent** or **chemical-like** odors ? ☐ Yes ☑ No Describe : _____

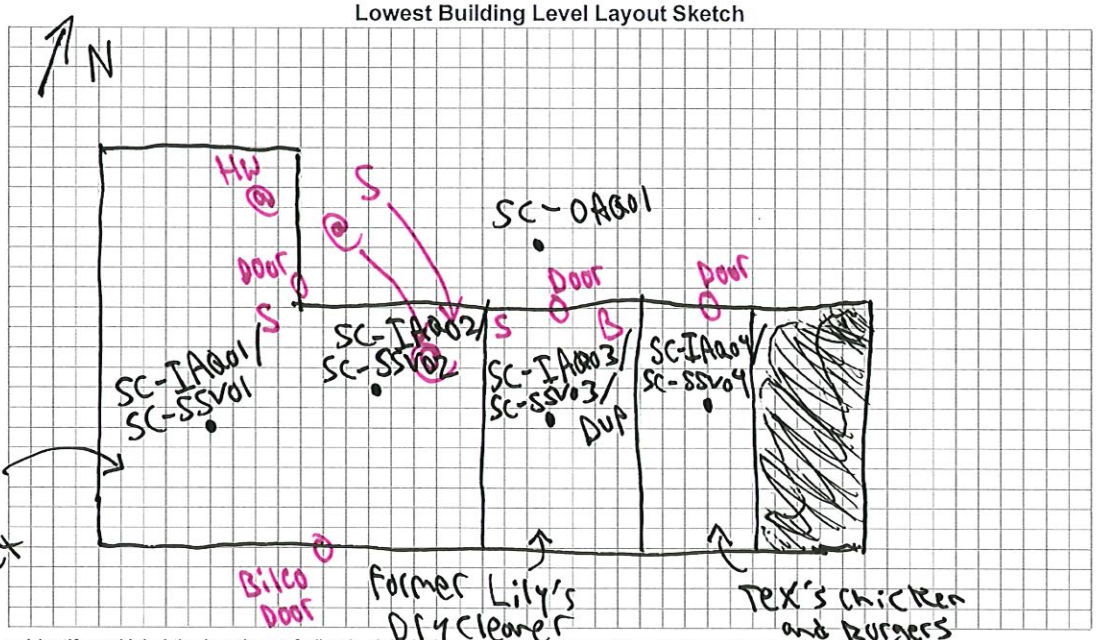
Last time **Dry Cleaned** fabrics brought in ? ~~_____~~ What / Where ? ~~_____~~

Do any building occupants use solvents at work ? ~~☐ Yes ☑ No~~ Describe : ~~_____~~

Any testing for Radon ? ☐ Yes ☑ No Results : _____

Radon System/Soil Vapor Intrusion Mitigation System present ? ☐ Yes ☑ No If yes, describe below

Lowest Building Level Layout Sketch



City fresh market

- Identify and label the locations of all sub-slab, indoor air, and outdoor air samples on the layout sketch.
- Measure the distance of all sample locations from identifiable features, and include on the layout sketch.
- Identify room use (bedroom, living room, den, kitchen, etc.) on the layout sketch.
- Identify the locations of the following features on the layout sketch, using the appropriate symbols:

B or F	Boiler or Furnace	o	Other floor or wall penetrations (label appropriately)
HW	Hot Water Heater	xxxxxxx	Perimeter Drains (draw inside or outside outer walls as appropriate)
FP	Fireplaces	######	Areas of broken-up concrete
WS	Wood Stoves	● SS-1	Location & label of sub-slab vapor samples
W/D	Washer / Dryer	● IA-1	Location & label of indoor air samples
S	Sumps	● OA-1	Location & label of outdoor air samples
@	Floor Drains	● PFET-1	Location and label of any pressure field test holes.

Structure Sampling - Product Inventory

Homeowner Name & Address: 655-671 Stanley Ave Date: 3/26/25

Samplers & Company: John Zwar, Jessica Ferngren - Castleton Structure ID:

Site Number & Name: Phone Number:

Make & Model of PID: Mini. Rae 3000 Date of PID Calibration:

Identify any Changes from Original Building Questionnaire :

Product Name/Description	Quantity	Chemical Ingredients	PID Reading	Location
Unknown Drum w/ Toxic and Haz Waste labels	2	—	0	Fraser Dry Cleaner basement
Clorox Bleach	(1) 15-oz	Sodium Hypochlorite, Sodium Chloride, Sodium carbonate, Sodium Hydroxide, Sodium Chlorate	0	Bathroom - City market
Mistolino cleaner	(1) 15-oz	Ethoxylate, Branched-Nonylphenol, Alkyl dimethyl benzyl ammonium chloride	0	↓
Comet Bleach	(1) 25-oz	Calcium carbonate, Calcium Hydroxide, Sodium carbonate, Trichloro-S-triazinetrione	0	↓
Top Job Bleach	(1) Gallon	Sodium Hypochlorite,...	0	City Market Basement
Clorox Bleach	(1) gal	Sodium Hypochlorite...	0	↓
Clorox cleaner + Bleach	(1) 32-oz	Sodium Hypochlorite...	0	↓
Zep degreaser	(1) 5-gal	Alcohols, C9-11, ethoxylated, Oxirane, 2-butoxyethanol, sodium hydroxide	0	↓
Uverde Soap	(1) 1 gal		0	↓
Touch N Tone Spray Paint	(1) 10-oz	Acetone, n-butane, Toluene, titanium dioxide, propane, Aliphatic Petroleum distillate	0	↓
Zinsser Shellac finish & sealer	(1) 32-oz	Methyl Isobutyl Ketone, Isopropanol SD Alcohol 38B	0	↓
Cleaner Wax	(1) 1102	Petroleum distillates	0	↓
Semi-gloss paint	(3) 1 gallon	Titanium dioxide	0	↓
Raid	(1) 496 grams	Imiprothrin, Cyfermethrin, Petroleum distillates	0	↓
Sani-Cycle Yellow High Performance Degreaser	(3) ~1 gal	Not listed	0	↓
" Glass & Hard Surface Cleaner	(4) ~1 gallon	Not listed	0	↓
" Trompa Degreaser	(2) ~2 gallon	Not listed	0	↓
Citgo Transgard ATF Dexron-III	(1)	Petroleum distillates, Hydrogen chloride, Phenol, Ethanediol, 2-ethylhexyl acrylate, ethyl acrylate	0	↓
GreenScene Blitz Multi-Purpose cleaner	(1) 1 quart	Diethylene glycol, butyl ether, 2-Phenoxyl, Ethanol, Detergent, Ethoxylate, Hyd. Peroxide	0	↓
Hy Pro Grand Labs	(1) 1 gallon		0	↓
Solar Manual Liquid and Dish Detergent	(1) 1 gal	Sodium chloride, dodecyl benzenesulphonate	0	↓
Simoniz Quat 64 Disinfectant	(2) 1 gal	Didecyl dimethyl ammonium chloride, N-Alkyl, dimethylbenzyl ammonium Chloride.	0	↓
Rustoleum Gloss Protective Enamel	(1) 12-oz	Xylenes, Naphtha, Zirconium 2 Ethyl hexanoate, Ethylbenzene, Methyl Ethyl Ketoxime	0	↓

Structure Sampling - Product Inventory

Homeowner Name & Address: 655-671 Stanley Ave Date: 3/26/25

Samplers & Company: John Zoter, Jessica Ferngler Structure ID:

Site Number & Name: Phone Number:

Make & Model of PID: Date of PID Calibration:

Identify any Changes from Original Building Questionnaire :

Product Name/Description	Quantity	Chemical Ingredients	PID Reading	Location
All purpose Joint compound	(1) 3.5 qt	Limestone, Attapulgite, Perlite	0	↓
CLS-11 Cleaner, Detergent	(2) 1/2 gallon	Not listed	0	↓
Rational Cleaner Tab P-free	(1) 5-gal bucket of tabs.	Sodium Hydroxide, Disodium metasilicate, Sodium carbonate, Fatty Alcohol Ethoxylate	0	Tex's chicken Basement
+ care tab cleaner	bucket of tabs	Polycarboxylates, Non-Ionic Surfactants	0	↓
Simoniz Z-100 Purple	(1) 5-gal bucket	Alcohols, C9-11, ethoxylated and Oxirane, methyl-, polymer w/ oxirane, mono (2-ethylhexyl) ether.	0	City Market Basement

APPENDIX F
MONITORING WELL SURVEY

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

PARALLEL WITH STANLEY AVENUE
77'-4½" (DESCR.)
77'-4⅛" (ACT.)

04/08/2025
MW05
LAT: 40.659484
LONG: -73.884319
RIM EL.5.42
T.O.PVC PIPE EL.5.24

1 STY BRICK

65'-0"

PARALLEL WITH HENDRIX STREET

90°

25'-0"

04/08/2025
MW06
LAT: 40.659416
LONG: -73.884246
RIM EL.4.62
T.O.PVC PIPE EL.4.44

04/08/2025
MW02-D
LAT: 40.659397
LONG: -73.884021
RIM EL.13.62
T.O.PVC PIPE EL.13.43

04/08/2025
MW01-I
LAT: 40.659351
LONG: -73.884105
RIM EL.13.47
T.O.PVC PIPE EL.13.06

04/08/2025
MW02-I
LAT: 40.659392
LONG: -73.884029
RIM EL.13.60
T.O.PVC PIPE EL.13.41

SICILIENA STREET

PARALLEL WITH HENDRIX STREET

1 STY BRICK

95'-0"

90°

20'-0"

80'WIDE

#655

04/08/2025
MW03
LAT: 40.659279
LONG: -73.884275
RIM EL.13.27
T.O.PVC PIPE EL.13.04

04/08/2025
MW01-D
LAT: 40.659357
LONG: -73.884096
RIM EL.13.45
T.O.PVC PIPE EL.13.17

04/08/2025
MW02
LAT: 40.659388
LONG: -73.884023
RIM EL.13.46
T.O.PVC PIPE EL.12.99

CURB LINE

155'-0"

04/08/2025
MW01
LAT: 40.659348
LONG: -73.884114
RIM EL.13.49
T.O.PVC PIPE EL.13.07

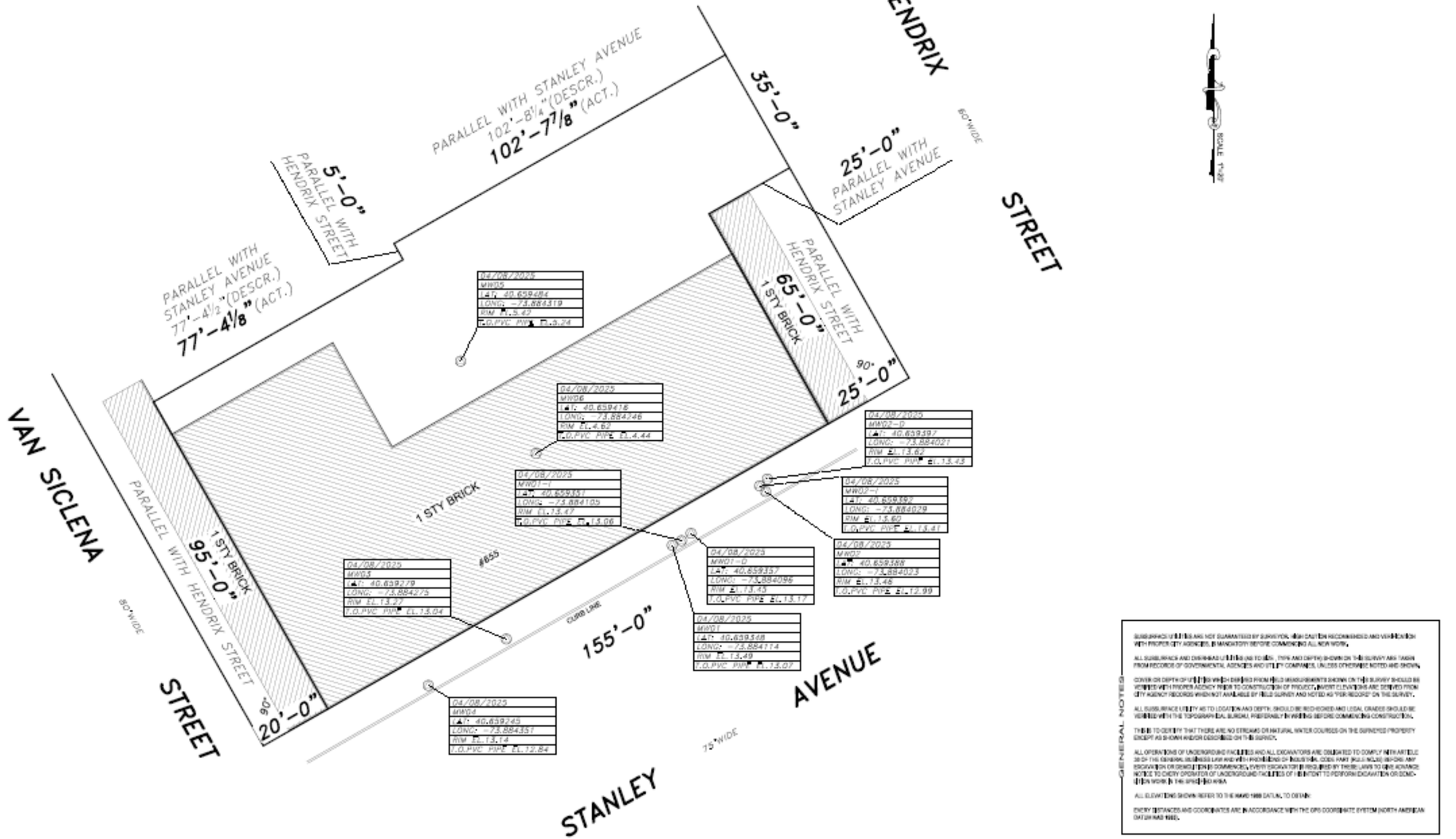
04/08/2025
MW04
LAT: 40.659245
LONG: -73.884351
RIM EL.13.14
T.O.PVC PIPE EL.12.84

AVENUE

75'WIDE

JOB NO: B 4353-29-MW

DATE: APRIL 8, 2025
MONITORING WELL SURVEY



GRAPHIC SCALE

ALL WRITTEN INCLUSIONS AND OFFSETS NOTED ON THIS SURVEY SUPERSEDE MEASUREMENTS SCALED OF THIS PLOT.

SCALE 1:20

3,05 m 6,10 m 9,14 m 12,20 m 15,24 m 30,48 meters

0 10 f 20 f 30 f 40 f 50 f 100 feet

GENERAL NOTES

SUBSURFACE UTILITIES ARE NOT GUARANTEED BY SURVEYOR. HIGH CAUTION RECOMMENDED AND VERIFICATION WITH PROPER CITY AGENCIES, IS MANDATORY BEFORE COMMENCING ALL NEW WORK.

ALL SUBSURFACE AND OVERHEAD UTILITIES AS TO SIZE, TYPE AND DEPTH SHOWN ON THIS SURVEY ARE TAKEN FROM RECORDS OF GOVERNMENTAL AGENCIES AND UTILITY COMPANIES, UNLESS OTHERWISE NOTED AND SHOWN.

COVER OR DEPTH OF UTILITIES WHICH DIFFERS FROM FIELD MEASUREMENTS SHOWN ON THIS SURVEY SHOULD BE VERIFIED WITH PROPER AGENCY PRIOR TO CONSTRUCTION OF PROJECT. INVERT ELEVATIONS ARE DERIVED FROM CITY AGENCY RECORDS WHEN NOT AVAILABLE BY FIELD SURVEY AND NOTED AS "PER RECORD" ON THE SURVEY.

ALL SUBSURFACE UTILITY AS TO LOCATION AND DEPTH, SHOULD BE RECHECKED AND LEGAL GRADES SHOULD BE VERIFIED WITH THE TOPOGRAPHICAL BUREAU, PREFERABLY IN WRITING BEFORE COMMENCING CONSTRUCTION.

THIS IS TO CERTIFY THAT THERE ARE NO STREAMS OR NATURAL WATER COURSES ON THE SURVEYED PROPERTY EXCEPT AS SHOWN AND/OR DESCRIBED ON THIS SURVEY.

ALL OPERATIONS OF UNDERGROUND FACILITIES AND ALL EXCAVATORS ARE OBLIGATED TO COMPLY WITH ARTICLE 36 OF THE GENERAL BUSINESS LAW AND WITH PROVISIONS OF INDUSTRIAL CODE RULE INCLUDING ANY EXCAVATION OR DEMOLITION COMMENCES, EVERY EXCAVATOR IS REQUIRED BY THESE LAWS TO GIVE ADVANCE NOTICE TO EVERY OPERATOR OF UNDERGROUND FACILITIES OF HIS INTENT TO PERFORM EXCAVATION OR DEMOLITION WORK IN THE STATE OF NEW YORK.

ALL ELEVATIONS SHOWN REFER TO THE NAVD 1988 DATUM, TO OBTAIN:

ENTRY DISTANCES AND COORDINATES ARE IN ACCORDANCE WITH THE GPS COORDINATE SYSTEM (NORTH AMERICAN DATUM NAD 1983).

655 STANLEY AVENUE, BROOKLYN, KINGS CO., NY,

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fax: (718) 872-9699
info@ppsurveying.com
www.ppsurveying.com

DATE: APRIL 8, 2025

NYS LIC. NO. 050569

SEC. ..... BLOCK 4353 LOT 29

GUARANTEED TO: .....

TITLE NO. .....

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A TRUE COPY. GUARANTEES OR CERTIFICATIONS INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED AND ON HIS BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND LENDING INSTITUTION LISTED HEREON, AND TO THE ASSIGNEES OF THE LENDING INSTITUTION. GUARANTEES OR CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

APPENDIX G
DRUM DISPOSAL APPROVAL AND MANIFEST

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

jgenvironmental
responsible safe solutions

April 23, 2025

Ms. Lisa Baldwin
Innovative Recycling Technologies, Inc.
690 North Queens Avenue
Lindenhurst, NY 11757

Notice Of Approval

Dear Ms. Baldwin,

JG Environmental, LLC. is pleased to provide you with this Notice of Approval into our Waste Processing facility in Lancaster, PA for the waste stream(s) listed below in accordance with our PA DEP Permit #101712. This approval letter is to confirm that JG has the appropriate permits, is authorized to store and/or treat these waste(s) and has the capacity necessary to handle the waste materials. We will process these materials in compliance with all applicable federal, state, and local regulations. The approvals are based upon the profile and other information provided to JG by your company. The generator of this waste is ultimately responsible for the accuracy and completeness of the information on the profile. Please notify us immediately if at any time there are changes to the waste.

NEWLY APPROVED PROFILES:

Estate of Ramon DeJesus Estevez
Non-Hazardous Purge Water Approval #2025-1809-SOL-4/22/2029

JG Environmental, LLC. appreciates the opportunity to assist you with your waste management needs.

Sincerely,

Andy Raymond

Andy Raymond
Director of Environmental Compliance

NON-HAZARDOUS WASTE MANIFEST

Please print or type (Form designed for use on elite (12 pitch) typewriter)

NON-HAZARDOUS WASTE

GENERATOR

NON-HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of
3. Generator's Name and Mailing Address [illegible]		600 [illegible] Bradley Avenue [illegible]	
4. Generator's Phone ([illegible]) [illegible]			

5. Transporter 1 Company Name	6. US EPA ID Number	A. State Transporter's ID
[illegible]	[illegible]	B. Transporter 1 Phone
7. Transporter 2 Company Name	8. US EPA ID Number	C. State Transporter's ID
[illegible]	[illegible]	D. Transporter 2 Phone
9. Designated Facility Name and Site Address [illegible]	10. US EPA ID Number [illegible]	E. State Facility's ID F. Facility's Phone

11. WASTE DESCRIPTION	Containers No.	Containers Type	13. Total Quantity	14. Unit Wt./Vol.
a. Non Hazardous, Non DOT Regulated Material (Purge water)	004	DM	[illegible]	P
b.				
c.				
d.				

G. Additional Descriptions for Materials Listed Above	H. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

[illegible]

16. **GENERATOR'S CERTIFICATION:** I hereby certify that the contents of this shipment are fully and accurately described and are in all respects in proper condition for transport. The materials described on this manifest are not subject to federal hazardous waste regulations.

Printed/Typed Name	Signature	Date: Month	Day	Year
		4	30	05

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date: Month	Day	Year
[illegible]	[illegible]	4	30	05

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date: Month	Day	Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of the waste materials covered by this manifest, except as noted in item 19.

Printed/Typed Name	Signature	Date: Month	Day	Year

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APPENDIX H
LABORATORY REPORTS

FOLLOW THE LINK BELOW FOR REPORTS:

NYSDEC SITE NO. 224415- Site Characterization Analytical Reports

70 West Main Street, Babylon, NY 11702
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APPENDIX I
DATA USABILITY SUMMARY REPORTS

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

ZDEZ2403, STANLEY AVENUE SITE, BROOKLYN, NEW YORK
DATA USABILITY SUMMARY REPORT
April 7, 2025 Groundwater Sampling -Part 375 Analytes
Lab Report No. L2520811

This data usability summary report (DUSR) was prepared in accordance with ***Appendix 2B*** of New York State Department of Environmental Conservation (NYSDEC) DER-10 using the entire original laboratory report, including the sample data summary report and the extended data package. The sampling event included two primary environmental groundwater samples and associated quality assurance/quality control (QA/QC) samples collected on April 7, 2025.

Sample Collection

The samples were collected in labeled laboratory-provided sample containers; no issues with sample containers or labeling were reported by the laboratory. Sampling procedures, including collection of field QA/QC samples, were reported to have been in accordance with the procedures presented in the NYSDEC-approved Quality Assurance Project Plan (January 2025, revised March 2025) for this project. All sample collection was conducted under Chain of Custody (COC) procedures.

Field QA/QC samples, including a trip blank sample, a blind duplicate sample, and a field (equipment rinseate) blank sample, were collected to evaluate field sampling methods and laboratory procedures.

Sample Analyses

The groundwater samples were transmitted to and analyzed by Alpha Analytical (now Pace Analytical Services) at their Westborough, MA facility, which is New York State Department of Health-certified for the analyses performed. The samples were prepared and analyzed for New York State Department of Environmental Conservation (NYSDEC) Target Compound List (TCL) volatile organic compounds (VOCs) using EPA Method 8260D; TCL semi-volatile organic compounds (SVOCs) and 1,4-dioxane by EPA Methods 3510C, 8270E-SIM ID and/or 8270E; TCL pesticides by EPA Methods 3510C and 8081B; TCL polychlorinated biphenyls (PCBs) by EPA Methods 3510C and 8082A, and/or, Target Analyte List (TAL) metals using Methods 3005A and 6020B and mercury using Method 7470A. The analytical methods and analytes are appropriate for the intended use of the data.

The samples were received on received on April 7, 2025; the samples reportedly arrived in good condition, were properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.1 degrees centigrade (°C). All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2º C of the required temperature or method-specified range.

The sample holding times were met and no problems with sample receipt or handling were reported by the laboratory.

None of the samples were reported to require dilution for any of the analytes.

QA/QC Results

Equipment Blank Sample

A field equipment rinseate blank sample was collected on April 7, 2025 and was analysed for the project analytes to evaluate potential contamination from field sampling procedures. No analytes were detected in the field equipment blank sample, with the following exceptions:

- A low estimated concentration of acetone was detected in the field blank. Acetone is common laboratory contaminant and this detection does not present any significant concern;
- A low estimated concentration of bis(2-ethylhexyl)phthalate was detected in the field blank. The results for this analyted that are below or at the same order of magnitude as the result in the field blank should be B-qualified. The attached table has been annotated accordingly.
- A low estimated concentration of 4,4"-DDT was detected in the field blank. However, as this analyte was not detected in any of the primary environmental samples and the detected concentration is well below the regulatory criteria, this detection does not present a significant concern.
- A low estimated concentration of total aluminum was detected in the field blank. As there is no regulatory criteria for aluminum in groundwater and the detected concentration was well below the concentrations in the primary environmental samples, this detection does not present a concern.
- Zinc was detected in the field blank at a level that is similar to the levels detected in many of the samples. Zinc was not noted in any of the lab blank QA/QC samples and the lab noted there was no potential for carry-over. Accordingly, the results for zinc that are below or at the same order of magnitude as the result in the field blank should be B-qualified. The attached table has been annotated accordingly.

Blind Duplicate Sample

A blind duplicate sample was collected and utilized to evaluate the precision of the laboratory analyses. The results from the duplicate sample (DUP) and the associated parent sample (MW-01) are similar for all analyte groups. Based on the blind duplicate sample results, the laboratory results are likely to be precise.

MS/MSD Samples

MS/MSD samples were utilized to evaluate the effect of the matrix on the reliability of the analytical results. Spiking occurs in the laboratory prior to sample preparation and analysis. Based on information provided by the analytical laboratory, the MS/MSD results were all within QC limits. Based upon these results, matrix-related effects have not significantly affected the analytical results.

Method Blank Samples

A Method blank (MB) sample was analysed by the laboratory to evaluate the potential for cross-contamination associated with the sample preparation and analysis. The MB results did not show concentrations of analytes above their method detection limits and/or the reporting limits in the sample. Based on these results, cross-contamination associated with sample preparation and analysis do not present a concern.

Laboratory Control Samples

Laboratory control samples (LCSs) and laboratory control samples duplicates (LCSDs) were used by the laboratory to verify the accuracy and precision of the analyses. The LCS and LCSD results were all within established guidelines and therefore, the analytical results are expected to be accurate and precise.

Initial Calibration Verification

Initial calibration verifications (ICVs) are midrange calibration standards that are analysed in order to verify that the calibration of the analytical system is acceptable prior to starting analyses. No target compounds exhibiting ICV excursions were noted.

Continuing Calibration Verification

Continuing calibration verifications (CCVs) are midrange calibration standards that are analysed to verify that the calibration of the analytical system is still acceptable and instrument calibration drift has not occurred. No target compounds exhibiting CCV excursions were noted by the laboratory.

Internal Standards

Internal Standards (ISs) are calibration standards that are analysed to verify that the analyses are accurate. No issues with the IS percent recoveries (%Rs) were noted. Based on these results, the analytical results are expected to be accurate.

Questions and Responses as per DER-10

1. Is the data package complete as defined under the current requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

   The data package is complete. The external and internal chain of custody forms are present and complete. The case narrative and sample analysis summaries are present and complete. The analytical QA/Q C summary forms, including surrogate recovery forms, LCS forms, IDL forms, initial and continuing calibration summary forms, standards raw data, tuning criteria report, and MB data are all present and complete. The data report forms, including sample prep logs, injection logs, and examples of the calculations used to determine the sample concentrations are all present and complete. The raw data used to identify and quantify the contract-specified analytes are present and complete.

2. Have all holding times been met?

   All samples were received and analyzed within the EPA-recommended holding times for the analyses performed.

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data, fall within the protocol-required limits and specifications?

   No – Although the majority of QC data were found to fall within the protocol-required limits and specifications, minor exceptions were noted above; however, these exceptions do not appear to significantly affect the data set.

4. Have all the data been generated using established and agreed-upon analytical protocols?

   Yes - all the data were generated using the analytical methodologies included in the NYSDEC-approved QAPP.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

   Yes – a representative number of raw data results were compared with the reported data results to confirm that the reported analytical results (identification and quantification) are substantiated by the raw data.

6. Have the correct data qualifiers been used?

   Yes – results below the quantitation limit and above the method detection limit have been J-qualified, zinc results up to the same order of magnitude as the zinc detection in the field blank sample have been B-qualified, and results analysed for but not detected have been U-qualified. No other qualifiers were indicated or applied.

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have

the corresponding QC summary sheets from the data package been attached to the DUSR?

Yes – exceedances have been noted in the DUSR and the corresponding QC summary sheets are attached.

Conclusions

The groundwater samples were reported to have been collected in accordance with the NYSDEC-approved QAPP for this project. No field or laboratory conditions occurred that would result in non-valid analytical data other than as noted above. The data appear to be adequate for their intended purpose.

Attachments

MW-1
MW-2
FB
Dup
TB
} full list
call 4/7



Pace Analytical Services

Laboratory Code: 11148

SDG Number: L2520811

The original project report/data package is held by Pace Analytical Services. This report/data package is paginated and should be reproduced only in its entirety. Pace Analytical Services holds no responsibility for results and/or data that are not consistent with the original.

Project Name: ZDEZ2403
Project Number: ZDEZ2403

Lab Number: L2520811
Report Date: 04/17/25

Lab Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2520811-01	MW02	WATER	STANLEY AVE	04/07/25 09:50	04/07/25
L2520811-02	MW01	WATER	STANLEY AVE	04/07/25 10:25	04/07/25
L2520811-03	FIELD BLANK	WATER	STANLEY AVE	04/07/25 10:30	04/07/25
L2520811-04	DUP	WATER	STANLEY AVE	04/07/25 12:00	04/07/25
L2520811-05	TB	WATER	STANLEY AVE	03/21/25 00:00	04/07/25

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Pace Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Pace's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Pace to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Total Metals

L2520811-03: The Field Blank has a result for zinc present above the reporting limit. The sample was verified as being labeled correctly by the laboratory and the previous analysis showed there was no potential for carry over.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelley Wolf Report Date: 04/17/25

Title: Technical Director/Representative

DATA PACKAGE GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

ND or U - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

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Pace Job Number : L2520811

Received : 07-APR-2025
Reviewer : Ryan Morrissey

Account Name : Castleton Environmental, Inc.
Project Number : ZDEZ2403
Project Name : ZDEZ2403

Ü»´·ª »®§ ×² °±® ¿¬±²

Samples Delivered By : Pace Courier

Chain of Custody : Present

Ý±±´»®×² °±® ¿¬±²

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
A	Absent/	Ice	4.1	

Ý±² ¼¬±² ×² °±® ¿¬±²

1) All samples on COC received?	ÇÛÍ
2) Extra samples received?	ÒÑ
3) Are there any sample container discrepancies?	ÒÑ
4) Are there any discrepancies between COC & sample labels?	ÒÑ
5) Are samples in appropriate containers for requested analysis?	ÇÛÍ
6) Are samples properly preserved for requested analysis?	ÇÛÍ
7) Are samples within holding time for requested analysis?	ÇÛÍ
8) All sampling equipment returned?	Òß

Ê±´¿¬» Ñ® ¿² ·½ ñÊÐØ

1) Reagent Water Vials Frozen by Client?	ÒÑ

NEW YORK CHAIN OF CUSTODY

L2520811
CASTLETONENV

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page of

Date Rec'd in Lab: 4/7/25

Client Information
Client: CASTLETON ENV
Address: 70 WEST MAIN ST BABYLON NY
Phone: 631-482-1818
Fax:
Email: JESSICA@CASTLETONENV.COM

Project Information
Project Name: ZDEZ2403
Project Location: STANLEY AVE
Project #: ZDEZ2403
(Use Project name as Project #)
Project Manager: JESSICA FERNGREN
ALPHAQuote #: 00177381

Turn-Around Time
Standard: X — Due Date:
Rush (only if pre approved): — # of Days:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:
CAT B DELIVERABLES

Please specify Metals or TAL.

Deliverables
- ASP-A
- X ASP-B
- EQuIS (1 File)
- EQuIS (4 File)
- Other

Regulatory Requirement
- X NY TOGS
- NY Part 375
- X AWQ Standards
- NY CP-51
- NY Restricted Use
- Other
- NY Unrestricted Use
- NYC Sewer Discharge

Billing Information
- X Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
- NJ
- NY
- Other:

Sample Filtration
- Done
- Lab to do

Preservation
- X Lab to do

DISSOLVED METALS
(Please Specify below)

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TCL VOAs	TCL SVOCs	TCL Pest	TCL PCBs	Total TAL Metals	Dissolved TAL Metals	1,4 Dioxane	Sample Specific Comments	Total Bottle
20811-01	MW02	4/7/25	0950	GW	JJ/JG	X	X	X	X	X	X	X		
-02	MW01	4/7/25	1025	GW	JJ/JG	X	X	X	X	X	X	X		
-03	FIELD BLANK	4/7/25	1030	GW	JJ/JG	X	X	X	X	X	X	X		
-04	DUP	4/7/25	1200	GW	JJ/JG	X	X	X	X	X	X	X		
-05	TB					X								

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; K/E = Zn Ac/NaOH; O = Other

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type
Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
	4/7/25 1300		4/7/25 1300
	4/7/25 1725		4/7/25 1725
	4/7/25 2300		4/8 2300

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Results Summary
Form 1
Volatile Organics by GC/MS

Client	: Castleton Environmental, Inc.	Lab Number	: L2520811
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2520811-03	Date Collected	: 04/07/25 10:30
Client ID	: FIELD BLANK	Date Received	: 04/07/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/17/25 00:17
Sample Matrix	: WATER	Dilution Factor	: 1
Analytical Method	: 1,8260D	Analyst	: MJV
Lab File ID	: V22250416N14	Instrument ID	: VOA122
Sample Amount	: 10 ml	GC Column	: RTX-502.2
Level	: LOW	%Solids	: N/A
Extract Volume (MeOH)	: N/A	Injection Volume	: N/A

		ug/L			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
75-00-3	Chloroethane	ND	2.5	0.70	U
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	U
156-60-5	trans-1,2-Dichloroethene	ND	2.5	0.70	U
79-01-6	Trichloroethene	ND	0.50	0.18	U
95-50-1	1,2-Dichlorobenzene	ND	2.5	0.70	U
541-73-1	1,3-Dichlorobenzene	ND	2.5	0.70	U
106-46-7	1,4-Dichlorobenzene	ND	2.5	0.70	U
1634-04-4	Methyl tert butyl ether	ND	2.5	0.17	U
179601-23-1	p/m-Xylene	ND	2.5	0.70	U
95-47-6	o-Xylene	ND	2.5	0.70	U
1330-20-7	Xylenes, Total	ND	2.5	0.70	U
156-59-2	cis-1,2-Dichloroethene	ND	2.5	0.70	U
540-59-0	1,2-Dichloroethene, Total	ND	2.5	0.70	U
74-95-3	Dibromomethane	ND	5.0	1.0	U
96-18-4	1,2,3-Trichloropropane	ND	2.5	0.70	U
107-13-1	Acrylonitrile	ND	5.0	1.5	U
100-42-5	Styrene	ND	2.5	0.70	U
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	U
67-64-1	Acetone	2.4	5.0	1.5	J
75-15-0	Carbon disulfide	ND	5.0	1.0	U
78-93-3	2-Butanone	ND	5.0	1.9	U
108-05-4	Vinyl acetate	ND	5.0	1.0	U
108-10-1	4-Methyl-2-pentanone	ND	5.0	1.0	U
591-78-6	2-Hexanone	ND	5.0	1.0	U
74-97-5	Bromochloromethane	ND	2.5	0.70	U

Results Summary
Form 1
Semivolatile Organics by GC/MS

Client	: Castleton Environmental, Inc.	Lab Number	: L2520811
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2520811-03	Date Collected	: 04/07/25 10:30
Client ID	: FIELD BLANK	Date Received	: 04/07/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/11/25 05:56
Sample Matrix	: WATER	Date Extracted	: 04/09/25
Analytical Method	: 1,8270E	Dilution Factor	: 1
Lab File ID	: 20811-03	Analyst	: SLR
Sample Amount	: 100 ml	Instrument ID	: SV106
Extraction Method	: EPA 3510C	GC Column	: RTX5-MS
Extract Volume	: 1000 uL	%Solids	: N/A
GPC Cleanup	: N	Injection Volume	: 1 uL

		ug/L			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.98	U
111-44-4	Bis(2-chloroethyl)ether	ND	2.0	0.39	U
95-50-1	1,2-Dichlorobenzene	ND	2.0	0.33	U
541-73-1	1,3-Dichlorobenzene	ND	2.0	0.32	U
106-46-7	1,4-Dichlorobenzene	ND	2.0	0.39	U
91-94-1	3,3'-Dichlorobenzidine	ND	5.0	1.8	U
121-14-2	2,4-Dinitrotoluene	ND	5.0	0.54	U
606-20-2	2,6-Dinitrotoluene	ND	5.0	0.84	U
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.39	U
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.24	U
108-60-1	Bis(2-chloroisopropyl)ether	ND	2.0	0.40	U
111-91-1	Bis(2-chloroethoxy)methane	ND	5.0	0.84	U
77-47-4	Hexachlorocyclopentadiene	ND	20	1.2	U
78-59-1	Isophorone	ND	5.0	0.86	U
98-95-3	Nitrobenzene	ND	2.0	0.20	U
86-30-6	NDPA/DPA	ND	2.0	0.92	U
621-64-7	n-Nitrosodi-n-propylamine	ND	5.0	0.91	U
117-81-7	Bis(2-ethylhexyl)phthalate	2.1	3.0	1.4	J
85-68-7	Butyl benzyl phthalate	ND	5.0	2.6	U
84-74-2	Di-n-butylphthalate	ND	5.0	0.96	U
117-84-0	Di-n-octylphthalate	ND	5.0	2.3	U
84-66-2	Diethyl phthalate	ND	5.0	0.76	U

Form 1
METALS

Client	: Castleton Environmental, Inc.	Lab Number	: L2520811
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2520811-03	Date Collected	: 04/07/25 10:30
Client ID	: FIELD BLANK	Date Received	: 04/07/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/15/25 09:10
Sample Matrix	: WATER	Dilution Factor	: 1
Analytical Method	: 1,6020B	Analyst	: NTB
Lab File ID	: WG2053879.pdf	Instrument ID	: ICPMSQ
Sample Amount	: 50ml	%Solids	: N/A
Digestion Method	: EPA 3005A	Date Digested	: 04/12/25

		mg/l			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
7429-90-5	Aluminum, Total	0.00566	0.0100	0.00327	J
7440-36-0	Antimony, Total	ND	0.00400	0.00042	U
7440-38-2	Arsenic, Total	ND	0.00050	0.00016	U
7440-39-3	Barium, Total	ND	0.00050	0.00017	U
7440-41-7	Beryllium, Total	ND	0.00050	0.00010	U
7440-43-9	Cadmium, Total	ND	0.00020	0.00005	U
7440-70-2	Calcium, Total	ND	0.100	0.0394	U
7440-47-3	Chromium, Total	ND	0.00100	0.00017	U
7440-48-4	Cobalt, Total	ND	0.00050	0.00016	U
7440-50-8	Copper, Total	ND	0.00100	0.00038	U
7439-89-6	Iron, Total	ND	0.0500	0.0191	U
7439-92-1	Lead, Total	ND	0.00100	0.00034	U
7439-95-4	Magnesium, Total	ND	0.0700	0.0242	U
7439-96-5	Manganese, Total	ND	0.00100	0.00044	U
7440-02-0	Nickel, Total	ND	0.00200	0.00055	U
7440-09-7	Potassium, Total	ND	0.100	0.0309	U
7782-49-2	Selenium, Total	ND	0.00500	0.00173	U
7440-22-4	Silver, Total	ND	0.00040	0.00016	U
7440-23-5	Sodium, Total	ND	0.500	0.0293	U
7440-28-0	Thallium, Total	ND	0.00100	0.00014	U
7440-62-2	Vanadium, Total	ND	0.00500	0.00157	U
7440-66-6	Zinc, Total	0.01608	0.01000	0.00341	

Results Summary
Form 1
Organochlorine Pesticides by GC

Client	: Castleton Environmental, Inc.	Lab Number	: L2520811
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2520811-03	Date Collected	: 04/07/25 10:30
Client ID	: FIELD BLANK	Date Received	: 04/07/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/09/25 19:38
Sample Matrix	: WATER	Date Extracted	: 04/09/25
Analytical Method	: 1,8081B	Dilution Factor	: 1
Lab File ID	: 11250409a-38	Analyst	: JAG
Sample Amount	: 100 ml	Instrument ID	: PEST11
Extraction Method	: EPA 3510C	GC Column	: CLPPesticides
Extract Volume	: 1000 uL	%Solids	: N/A
GPC Cleanup	: N	Injection Volume	: 1 uL
Sulfur Cleanup	: N		

		ug/L			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
50-29-3	4,4'-DDT	0.015	0.029	0.013	J

ZDEZ2403, STANLEY AVENUE SITE, BROOKLYN, NEW YORK
DATA USABILITY SUMMARY REPORT
April 7, 2025 Groundwater Sampling -PFAS
Lab Report No. L2520812

This data usability summary report (DUSR) was prepared in accordance with ***Appendix 2B*** of New York State Department of Environmental Conservation (NYSDEC) DER-10 using the entire original laboratory report, including the sample data summary report and the extended data package. The sampling event included two primary environmental groundwater samples and associated quality assurance/quality control (QA/QC) samples collected on April 7, 2025.

Sample Collection

The samples were collected in labeled laboratory-provided sample containers; no issues with sample containers or labeling were reported by the laboratory. Sampling procedures, including collection of field QA/QC samples, were reported to have been in accordance with the procedures presented in the NYSDEC-approved Quality Assurance Project Plan (January 2025, revised March 2025) for this project. All sample collection was conducted under Chain of Custody (COC) procedures.

Field QA/QC samples, including a blind duplicate sample and a field (equipment rinsate) blank sample, were collected to evaluate field sampling methods and laboratory procedures.

Sample Analyses

The groundwater samples were transmitted to and analyzed by Alpha Analytical (now Pace Analytical Services) at their Westborough, MA facility, which is New York State Department of Health-certified for the analyses performed. The samples were prepared and analyzed for New York State Department of Environmental Conservation (NYSDEC) per- and polyfluorinated alkyl substances (PFAS) by EPA Method 1633 (Liquid Chromatography/Tandem Mass Spectrometry [LC/MS/MS]). The analytical method and analytes are appropriate for the intended use of the data.

The samples were received on received on April 7, 2025; the samples reportedly arrived in good condition, were properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.4 degrees centigrade (°C). All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2° C of the required temperature or method-specified range.

The sample holding times were met and no problems with sample receipt or handling were reported by the laboratory.

None of the samples required dilution for any of the analytes.

QA/QC Results

Equipment Blank Sample

A field equipment rinseate blank sample was collected on April 7, 2025 and was analysed for the project analytes to evaluate potential contamination from field sampling procedures. No PFAS compounds were detected in the field equipment blank sample at concentrations above their respective method detection limits.

Blind Duplicate Sample

A blind duplicate sample was collected and utilized to evaluate the precision of the laboratory analyses. The results from the duplicate sample (DUP) and the associated parent sample (MW-01) are similar for all PFAS analytes. Based on the blind duplicate sample results, the laboratory

results are likely to be precise.

MS/MSD Samples

MS/MSD samples were utilized to evaluate the effect of the matrix on the reliability of the analytical results. Spiking occurs in the laboratory prior to sample preparation and analysis. Based on information provided by the analytical laboratory, the MS/MSD results were all within QC limits. Based upon these results, matrix-related effects have not significantly affected the analytical results.

Method Blank Samples

A Method blank (MB) sample was analysed by the laboratory to evaluate the potential for cross-contamination associated with the sample preparation and analysis. The MB results did not show concentrations of analytes above their method detection limits and/or the reporting limits in the sample. Based on these results, cross-contamination associated with sample preparation and analysis do not present a concern.

Laboratory Control Samples

Laboratory control samples (LCSs) were used by the laboratory to verify the accuracy of the analyses. The LCS results were all within established guidelines and therefore, the analytical results are expected to be accurate.

Initial Calibration Verification

Initial calibration verifications (ICVs) are midrange calibration standards that are analysed in order to verify that the calibration of the analytical system is acceptable prior to starting analyses. No target compounds exhibiting ICV excursions were noted.

Continuing Calibration Verification

Continuing calibration verifications (CCVs) are midrange calibration standards that are analysed to verify that the calibration of the analytical system is still acceptable and instrument calibration drift has not occurred. No target compounds exhibiting CCV excursions were noted in the laboratory Form VIIs.

Internal Standards

Internal Standards (ISs) are calibration standards that are analysed to verify that the analyses are accurate. No issues with the IS percent recoveries (%Rs) were noted except as follows:

- The extracted IS %Rs were above the acceptance criteria (biased high) for d3-NMEFOSAA in the Field Blank sample. As the associated sample was non-detect for all associated target analytes, re-analysis was not required.
- The extracted IS %Rs were above acceptance criteria (biased high) for m2-6:2FTS and d5-NETFOSAA for the MB sample. As the associated sample was non-detect for all associated target analytes; re-analysis was not required.
- The extracted IS %Rs were above acceptance criteria (biased high) for d3-NMEFOSAA and d5-NETFOSAA for an LCS sample. All associated target analytes were within the overall LCS criteria and, therefore, no further action was taken.

Based on these results, the analytical results are expected to be accurate.

Questions and Responses as per DER-10

1. Is the data package complete as defined under the current requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The data package is complete. The external and internal chain of custody forms are present and complete. The case narrative and sample analysis summaries are present and complete. The analytical QA/Q C summary forms, including surrogate recovery forms, LCS forms, IDL forms, initial and continuing calibration summary forms, standards raw data, tuning criteria report, and MB data are all present and complete. The data report forms, including sample prep logs, injection logs, and examples of the calculations used to determine the sample concentrations are all present and complete. The raw data used to identify and quantify the contract-specified analytes are present and complete.

2. Have all holding times been met?

   All samples were received and analyzed within the EPA-recommended holding times for the analyses performed.

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data, fall within the protocol-required limits and specifications?

   No – Although the majority of QC data were found to fall within the protocol-required limits and specifications, minor exceptions were noted above; however, these exceptions do not appear to significantly affect the data set.

4. Have all the data been generated using established and agreed-upon analytical protocols?

   Yes - all the data were generated using the analytical methodologies included in the NYSDEC-approved QAPP.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

   Yes – a representative number of raw data results were compared with the reported data results to confirm that the reported analytical results (identification and quantification) are substantiated by the raw data.

6. Have the correct data qualifiers been used?

   Yes – results below the quantitation limit and above the method detection limit have been J-qualified, and results analysed for but not detected have been U-qualified. No other qualifiers were indicated or applied.

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

   Yes – exceedances have been noted in the DUSR and the corresponding QC summary sheets are attached.

Conclusions

The groundwater samples were reported to have been collected in accordance with the NYSDEC-approved QAPP for this project. No field or laboratory conditions occurred that would result in non-valid analytical data other than as noted above. The data appear to be adequate for their intended purpose.

Attachments

MW-1
MW-2 } PFAS only



Pace Analytical Services

Laboratory Code: 11148

SDG Number: L2520812

The original project report/data package is held by Pace Analytical Services. This report/data package is paginated and should be reproduced only in its entirety. Pace Analytical Services holds no responsibility for results and/or data that are not consistent with the original.

Project Name: ZDEZ2403
Project Number: ZDEZ2403

Lab Number: L2520812
Report Date: 04/28/25

Lab Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2520812-01	MW02	WATER	STANLEY AVE	04/07/25 09:50	04/07/25
L2520812-02	MW01	WATER	STANLEY AVE	04/07/25 10:25	04/07/25
L2520812-03	FIELD BLANK	WATER	STANLEY AVE	04/07/25 10:30	04/07/25
L2520812-04	DUP	WATER	STANLEY AVE	04/07/25 12:00	04/07/25

Project Name:	ZDEZ2403	**Lab Number:**	L2520812
Project Number:	ZDEZ2403	**Report Date:**	04/28/25

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Pace Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Pace's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Pace to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by 1633

L2520812-03: The Extracted Internal Standard recoveries were above the acceptance criteria for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (178%). Since the sample was non-detect to the RL for all associated target analytes, re-analysis was not required.

WG2057394-1: The Extracted Internal Standard recoveries were above the acceptance criteria for 1h,1h,2h,2h-perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (249%) and n-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-netfosaa) (150%). Since the Blank was non-detect to the RL for all associated target analytes, re-analysis was not required.

The Extracted Internal Standard recovery for the WG2057394-2 LCS associated with L2520812-01 through -04 is outside the acceptance criteria for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (185%) and n-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-netfosaa) (141%); however, all associated target analytes are within overall LCS criteria; therefore, no further action was taken.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Ashley Deitao Report Date: 04/28/25

Title: Technical Director/Representative

DATA PACKAGE GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

ND or U - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

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Pace Job Number : L2520812

Account Name : Castleton Environmental, Inc.
Project Number : ZDEZ2403
Project Name : ZDEZ2403

Received : 07-APR-2025
Reviewer : Emily Denekamp

Ü»´·ª »®§ ×² º±® ¿¬±²

Samples Delivered By : Pace Courier

Chain of Custody : Present

Ý±±´»®×² º±® ¿¬±²

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
A	Absent/	Ice	4.4	

Ý±² ¼¬±² ×² º±® ¿¬±²

1) All samples on COC received?	ÇÛÍ
2) Extra samples received?	ÒÑ
3) Are there any sample container discrepancies?	ÒÑ
4) Are there any discrepancies between COC & sample labels?	ÒÑ
5) Are samples in appropriate containers for requested analysis?	ÇÛÍ
6) Are samples properly preserved for requested analysis?	ÇÛÍ
7) Are samples within holding time for requested analysis?	ÇÛÍ
8) All sampling equipment returned?	ÒÞ

Ê±´¿¬´» Ñ® ¿² ·½ ñÊÐØ

1) Reagent Water Vials Frozen by Client?	ÒÞ

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave. Suite 105

Page of

Date Rec'd in Lab: 4/8/25

ALPHA Job #: L2520812

Client Information
Client: Castleton Env
Address: 70 West Main St Babylon NY
Phone: 631-482-1818
Fax:
Email: JESSICA@castletonenv.com

Project Information
Project Name: ZDEZ2403
Project Location: STANLEY AVE
Project #: ZDEZ2403
(Use Project name as Project #)
Project Manager: JESSICA FERNANDEZ
ALPHAQuote #: Q0171381

Turn-Around Time
Standard: X — Due Date:
Rush (only if pre approved): — # of Days:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

Please specify Metals or TAL.

Deliverables
- ASP-A
- ASP-B
- EQuIS (1 File)
- EQuIS (4 File)
- Other

Billing Information
- X Same as Client Info
PO #

Regulatory Requirement
- X NY TOGS
- X AWQ Standards
- NY Restricted Use
- NY Unrestricted Use
- NYC Sewer Discharge
- NY Part 375
- NY CP-51
- Other

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
- NJ
- NY
- Other:

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS-NY 1L35	Total Bottle
20912-01	MW02	4/7/25	0950	GW	SZ/JG	X	
-02	MW01	4/7/25	1025	GW	SZ/JG	X	
-03	FIELD BLANK	4/7/25	1030	GW	SZ/JG	X	
-04	DUP	4/7/25	1200	GW	SZ/JG	X	

Sample Filtration
- Done
- Lab to do

Preservation
- Lab to do

(Please Specify below)

Sample Specific Comments

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code:
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type													
Preservative													

Relinquished By:	Date/Time	Received By:	Date/Time
	4/7/25 1700		4/7/25 1300
	4/7/25 1725		4/7/25 1725
	4/7/25 2000		4/7 2100

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

4/8/25 1500 — 4/8/25 1610 rec: Emily Dunleavy 4/8/25 16:10 — 04/07/25 23:48 — 4/8/25 1510

ZDEZ2403, STANLEY AVENUE SITE, BROOKLYN, NEW YORK
DATA USABILITY SUMMARY REPORT
April 7-8, 2025 Groundwater Sampling -Part 375 and PFAS Analytes
Lab Report No. L2521121

This data usability summary report (DUSR) was prepared in accordance with ***Appendix 2B*** of New York State Department of Environmental Conservation (NYSDEC) DER-10 using the entire original laboratory report, including the sample data summary report and the extended data package. The sampling event included eight primary environmental groundwater samples and associated quality assurance/quality control (QA/QC) samples collected on April 7 and 8, 2025.

Sample Collection

The samples were collected in labeled laboratory-provided sample containers; no issues with sample containers or labeling were reported by the laboratory. Sampling procedures, including collection of field QA/QC samples, were reported to have been in accordance with the procedures presented in the NYSDEC-approved Quality Assurance Project Plan (January 2025, revised March 2025) for this project. All sample collection was conducted under Chain of Custody (COC) procedures.

Field QA/QC samples, including two trip blank samples and a field (equipment rinseate) blank sample, were collected to evaluate field sampling methods and laboratory procedures.

An extra aliquot of one sample was collected and used as a site-specific matrix spike/matrix spike duplicate (MS/MSD) sample to evaluate the potential for matrix effects to affect the laboratory results.

Sample Analyses

The groundwater samples were transmitted to and analyzed by Alpha Analytical (now Pace Analytical Services) at their Westborough, MA facility, which is New York State Department of Health-certified for the analyses performed. The samples were prepared and analyzed for New York State Department of Environmental Conservation (NYSDEC) Target Compound List (TCL) volatile organic compounds (VOCs) using EPA Method 8260D; TCL semi-volatile organic compounds (SVOCs) and 1,4-dioxane by EPA Methods 3510C, 8270E-SIM ID and/or 8270E; TCL pesticides by EPA Methods 3510C and 8081B; TCL polychlorinated biphenyls (PCBs) by EPA Methods 3510C and 8082A, and/or, Target Analyte List (TAL) metals using Methods 3005A and 6020B, mercury using Method 7470A, and New York State Department of Environmental Conservation (NYSDEC) per- and polyfluorinated alkyl substances (PFAS) by EPA Method 1633 (Liquid Chromatography/Tandem Mass Spectrometry [LC/MS/MS]). The analytical methods and analytes are appropriate for the intended use of the data.

The samples were received on received on April 8, 2025; the samples reportedly arrived in good condition, were properly preserved and, where required, on ice. The temperature of the three coolers at receipt ranged from 2.9 to 3.5 degrees centigrade (°C). All samples that require thermal preservation are considered acceptable if the arrival temperature is within 2° C of the required temperature or method-specified range.

The sample holding times were met and no problems with sample receipt or handling were reported by the laboratory, except as follows:

- The samples from MW03, MW04, MW05, and MW06 required re-extractions for 1,4-dioxane analyses. The method-required holding time was exceeded for these analyses.

None of the samples were reported to require dilution for any of the analytes.

QA/QC Results

Equipment Blank Sample

A field equipment rinseate blank sample was collected on April 8, 2025 and was analysed for the project analytes to evaluate potential contamination from field sampling procedures. No analytes were detected in the field equipment blank sample, with the following exceptions:

- A low estimated concentration of acetone was detected in the field blank. Acetone is common laboratory contaminant and this detection does not present any significant concern;
- Bis(2-ethylhexyl)phthalate was detected in the field blank. However, as this analyte was not detected in any of the associated primary environmental samples, this detection does not present a significant concern.
- Low estimated concentrations of total and dissolved aluminum were detected in the field blank. As there is no regulatory criteria for aluminum in groundwater these detections do not present significant concerns. However, any detections in the associated samples that are below or at the same order of magnitude as these detections should be B-qualified. The attached table has been annotated accordingly.
- A low estimated concentration of total barium was detected in the field blank. As the detections in the associated samples are significantly higher than the detections in the blank, this detection does not present a significant concern.
- Low estimated concentrations of total and dissolved calcium were detected in the field blank. As there is no regulatory criteria for calcium in groundwater and the detections in the associated samples are significantly higher than the detections in the blank, these detections do not present significant concerns.
- Total zinc was detected in the field blank at a level that is similar to the levels detected in many of the samples, but well below the regulatory criteria. The results for zinc that are below or at the same order of magnitude as the result in the field blank should be B-qualified. The attached table has been annotated accordingly.

Blind Duplicate Sample

A blind duplicate sample was not analysed with this sample delivery group (SDG). However, a blind duplicate sample was collected for this project on April 7, 2025 and analysed in a separate SDG. These data were reviewed and the results from the duplicate sample (DUP) and the associated parent sample (MW-01) were similar for all analyte groups. Based on the blind duplicate sample results, the laboratory results are likely to be precise for this project.

Trip Blank Samples

Two trip blank samples were submitted with this SDG. These samples were understood to have been transported with the coolers containing the VOC samples. Trip blank samples are used to verify that cross-contamination between samples to be tested for VOCs did not occur in the field, in transit or in the laboratory. No TCL VOCs were detected in either of the trip blank samples, supporting the conclusion that no cross-contamination occurred between samples.

MS/MSD Samples

A site-specific MS/MSD sample was collected and utilized to evaluate the effect of the matrix on the reliability of the analytical results. Spiking occurs in the laboratory prior to sample preparation and analysis. Based on information provided by the analytical laboratory, the MS/MSD results were all within QC limits, except as follows:

- The MS %R for PFOA was outside (biased high) for the MW06 sample. The PFOA results in the associated samples may be biased high.

- The MS %R for total calcium was outside (biased high) for the MW06 sample. However, the upper control limit does not apply in this case as the sample concentration was greater than four times the spike amount added to the sample.
- The MS and MSD %Rs for sodium were outside of acceptance criteria. A post-digestion spike was performed and was within acceptance criteria. No corrective action was needed and the results are reported.
- The MS %R for dissolved calcium was outside (biased high) for the MW06 sample. However, the upper control limit does not apply in this case as the sample concentration was greater than four times the spike amount added to the sample.

Based upon these results, matrix-related effects have not significantly affected the analytical results, with the potential exception of the PFOA results, which may be biased high.

Method Blank Samples

A Method Blank (MB) sample was analysed by the laboratory to evaluate the potential for cross-contamination associated with the sample preparation and analysis. The MB results did not show concentrations of analytes above their method detection limits and/or the reporting limits in the sample. Based on these results, cross-contamination associated with sample preparation and analysis do not present a concern.

Laboratory Control Samples

Laboratory control samples (LCSs) and laboratory control samples duplicates (LCSDs) were used by the laboratory to verify the accuracy and precision of the analyses. The LCS and LCSD results were all within established guidelines, with the following exceptions:

- The LCS/LCSD percent recoveries (%Rs) for 1,4-dioxane for samples MW03, MW04, MW05 and MW06 were outside the acceptance criteria (biased high) on the initial analyses. The samples were re-extracted and re-run with LCS/LCSD acceptance criteria achieved. The results of both extractions are reported but should be considered biased high. We note that 1,4-dioxane was not detected in the MW03, MW04 or MW05 samples. This analyte was detected in the MW06 samples (initial and re-extraction), but the results are below the regulatory criteria.

Based on these results, the analytical results are expected to be accurate and precise, except for the 1,4-doxane result in MW06, which may be biased high.

Initial Calibration Verification

Initial calibration verifications (ICVs) are midrange calibration standards that are analysed in order to verify that the calibration of the analytical system is acceptable prior to starting analyses. No target compounds exhibiting ICV excursions were noted.

Continuing Calibration Verification

Continuing calibration verifications (CCVs) are midrange calibration standards that are analysed to verify that the calibration of the analytical system is still acceptable and instrument calibration drift has not occurred. No target compounds exhibiting CCV excursions were noted by the laboratory.

Internal Standards

Internal Standards (ISs) are calibration standards that are analysed to verify that the analyses are accurate. No issues with the IS percent recoveries (%Rs) were noted except as follows:

- The extracted IS %Rs were above the acceptance criteria (biased high) for d3-

NMEFOSAA in the MW01-I sample. As the sample was non-detect to the reporting limit (RL) for all associated target analytes, re-analysis was not required.

- The extracted IS %Rs were above acceptance criteria (biased high) for m2-6:2FTS in the MW05 sample. As the associated sample was non-detect to the RL for all associated target analytes; re-analysis was not required.
- The extracted IS %Rs were above acceptance criteria (biased high) for m2-6:2FTS for the MW06 sample. As the associated sample was non-detect to the RL for all associated target analytes; re-analysis was not required.
- The extracted IS %Rs were above the acceptance criteria (biased high) for m2-6:2FTS and d5-NETFOSAA in the MB sample. As the sample was non-detect to the reporting limit (RL) for all associated target analytes, re-analysis was not required.
- The extracted IS %Rs for the LCS associated with the MW01-I and MW03 samples were above the acceptance criteria (biased high) for d3-NMEFOSAA and d5-NETFOSAA. As all associated target analytes were within the overall LCS criteria no further action was taken.

Based on these results, the analytical results are expected to be accurate.

Questions and Responses as per DER-10

1. Is the data package complete as defined under the current requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

   The data package is complete. The external and internal chain of custody forms are present and complete. The case narrative and sample analysis summaries are present and complete. The analytical QA/Q C summary forms, including surrogate recovery forms, LCS forms, IDL forms, initial and continuing calibration summary forms, standards raw data, tuning criteria report, and MB data are all present and complete. The data report forms, including sample prep logs, injection logs, and examples of the calculations used to determine the sample concentrations are all present and complete. The raw data used to identify and quantify the contract-specified analytes are present and complete.

2. Have all holding times been met?

   All samples were received and initially analysed within the EPA-recommended holding times for the analyses performed. The samples from MW03, MW04, MW05, and MW06 required re-extractions for 1,4-dioxane analyses; the method-required holding time was exceeded for these analyses.

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data, fall within the protocol-required limits and specifications?

   No – Although the majority of QC data were found to fall within the protocol-required limits and specifications, minor exceptions were noted above; however, these exceptions do not appear to significantly affect the data set.

4. Have all the data been generated using established and agreed-upon analytical protocols?

   Yes - all the data were generated using the analytical methodologies included in the NYSDEC-approved QAPP.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets

and quality control verification forms?

Yes – a representative number of raw data results were compared with the reported data results to confirm that the reported analytical results (identification and quantification) are substantiated by the raw data.

6. Have the correct data qualifiers been used?

   Yes – results below the quantitation limit and above the method detection limit have been J-qualified, select results up to the same order of magnitude as detections in associated blank samples have been B-qualified, and results analysed for but not detected have been U-qualified. No other qualifiers were indicated or applied.

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

   Yes – exceedances have been noted in the DUSR and the corresponding QC summary sheets are attached.

Conclusions

The groundwater samples were reported to have been collected in accordance with the NYSDEC-approved QAPP for this project. No field or laboratory conditions occurred that would result in non-valid analytical data other than as noted above. The data appear to be adequate for their intended purpose.

Attachments

MW-01-I
TB-3/21
MW-3 → 6.
MW-01D
MW-02I
EB
MW-02D

4/7 - 4/8



Pace Analytical Services

Laboratory Code: 11148

SDG Number: L2521121

The original project report/data package is held by Pace Analytical Services. This report/data package is paginated and should be reproduced only in its entirety. Pace Analytical Services holds no responsibility for results and/or data that are not consistent with the original.

Project Name: ZDEZ2403
Project Number: ZDEZ2403

Lab Number: L2521121
Report Date: 04/30/25

Lab Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2521121-01	MW01-I	WATER	STANLEY AVE	04/08/25 10:40	04/08/25
L2521121-02	TRIP BLANK	WATER	STANLEY AVE	03/21/25 00:00	04/08/25
L2521121-03	TRIP BLANK2	WATER	STANLEY AVE	03/21/25 00:00	04/08/25
L2521121-04	MW03	WATER	STANLEY AVE	04/07/25 12:55	04/08/25
L2521121-05	MW04	WATER	STANLEY AVE	04/07/25 13:15	04/08/25
L2521121-06	MW05	WATER	STANLEY AVE	04/07/25 15:15	04/08/25
L2521121-07	MW06	WATER	STANLEY AVE	04/07/25 14:45	04/08/25
L2521121-08	MW01-D	WATER	STANLEY AVE	04/08/25 09:10	04/08/25
L2521121-09	MW02-I	WATER	STANLEY AVE	04/08/25 09:50	04/08/25
L2521121-10	FIELD BLANK	WATER	STANLEY AVE	04/08/25 10:15	04/08/25
L2521121-11	MW02-D	WATER	STANLEY AVE	04/08/25 10:55	04/08/25

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Pace Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Pace's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Pace to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

April 30, 2025: This final report includes the results of all requested analyses.

April 21, 2025: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

L2521121-10: The Field Blank has a result for Bis(2-ethylhexyl)phthalate present above the reporting limit. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required.

1,4-Dioxane by 8270-SIM

L2521121-04RE, -05RE, -06RE, and -07RE: The sample was extracted with the method required holding time exceeded.

The WG2052762-2/-3 LCS/LCSD recoveries associated with L2521121-04 through -07 were outside the acceptance criteria for individual target compounds; however, the criteria were achieved upon re-extraction outside of holding time. The results of both extractions are reported; however, all results are considered to have a potentially high bias for 1,4-dioxane (144%/143%).

Perfluorinated Alkyl Acids by 1633

L2521121-01: The Extracted Internal Standard recovery was above the acceptance criteria for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (194%). Since the sample was non-detect to the RL for all associated target analytes, re-analysis was not required.

L2521121-06: The Extracted Internal Standard recovery was above the acceptance criteria for 1h,1h,2h,2h-perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (231%). Since the sample was non-detect to the RL for all associated target analytes, re-analysis was not required.

L2521121-07: The Extracted Internal Standard recovery was above the acceptance criteria for 1h,1h,2h,2h-

Case Narrative (continued)

perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (226%). Since the sample was non-detect to the RL for all associated target analytes, re-analysis was not required.

WG2057394-1: The Extracted Internal Standard recoveries were above the acceptance criteria for 1h,1h,2h,2h-perfluoro[1,2-13c2]octanesulfonic acid (m2-6:2fts) (249%) and n-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-netfosaa) (150%). Since the Blank was non-detect to the RL for all associated target analytes, re-analysis was not required.

The Extracted Internal Standard recoveries for the WG2057394-2 LCS associated with L2521121-01 and -04 are outside the acceptance criteria for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (185%) and n-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-netfosaa) (141%); however, all associated target analytes are within overall LCS criteria; therefore, no further action was taken.

The WG2057883-4 MS recovery performed on L2521121-07 is outside the acceptance criteria for perfluorooctanoic acid (pfoa) (182%).

Total Metals

The WG2053233-3 MS recovery performed on L2521121-07 does not apply for calcium (67%) because the sample concentration is greater than four times the spike amount added.

The WG2053233-3/-4 MS/MSD recoveries performed on L2521121-07 are outside the acceptance criteria for sodium (64%/68%). A post digestion spike was performed and was within acceptance criteria.

Dissolved Metals

The WG2054012-4 MSD recovery performed on L2521121-07 does not apply for calcium (128%) because the sample concentration is greater than four times the spike amount added.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Melissa Sturgis Report Date: 04/30/25

Title: Technical Director/Representative

DATA PACKAGE GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: DU Report with 'J' Qualifiers

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

ND or U - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Sample Delivery Group Summary

Pace Job Number : L2521121

Account Name : Castleton Environmental, Inc.
Project Number : ZDEZ2403
Project Name : ZDEZ2403

Received : 08-APR-2025
Reviewer : Kevin Law

Delivery Information

Samples Delivered By : Pace Courier

Chain of Custody : Present

Cooler Information

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
A	Absent/	Ice	3.5	
B	Absent/	Ice	2.9	
C	Absent/	Ice	3.5	

Condition Information

1) All samples on COC received?	YES
2) Extra samples received?	NO
3) Are there any sample container discrepancies?	NO
4) Are there any discrepancies between COC & sample labels?	NO
5) Are samples in appropriate containers for requested analysis?	YES
6) Are samples properly preserved for requested analysis?	YES
7) Are samples within holding time for requested analysis?	YES
8) All sampling equipment returned?	NA

Volatile Organics/VPH

1) Reagent Water Vials Frozen by Client?	NO

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page: of

Date Rec'd in Lab: 4/9/25

ALPHA Job #: L2521121

Client Information
Client: Castleton Env
Address: 70 West Main St, Babylon NY
Phone: 631 482-1818
Fax:
Email: jessica@castletonenv.com

Project Information
Project Name: ZDEZ2403
Project Location: STANLEY AVE
Project #: ZDEZ2403
(Use Project name as Project #)
Project Manager: JESSICA FERRIGNO
ALPHAQuote #:

Turn-Around Time
Standard: X — Due Date:
Rush (only if pre approved): — # of Days:

Deliverables
ASP-A — ASP-B: X
EQuIS (1 File) — EQuIS (4 File)
Other

Billing Information
Same as Client Info: X
PO #

Regulatory Requirement
NY TOGS: X
AWQ Standards: X
NY Restricted Use — NY Part 375
NY Unrestricted Use — NY CP-51
NYC Sewer Discharge — Other

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility: NJ — NY — Other:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:
NYCAT B DELIVERABLES

Please specify Metals or TAL.

ANALYSIS

Sample Filtration: Done — Lab to do
Preservation: Lab to do: X
(Please Specify below): FILTER DISSOLVED METALS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TCL VOCs 8260	NYTCLs/PCBs 8270	TCL Pest	TCL PCBs	Total TAL Metal	Dissolved TAL Metals	1,4 Dioxane	PFAS NY 1633	Sample Specific Comments	Total Bottles
21121-04	MW03	4/7/25	1255	GW	JG/JZ	X	X	X	X	X	X	X	X		
-05	MW04	4/7/25	1315	GW	JG/JZ	X	X	X	X	X	X	X	X		
-06	MW05	4/7/25	1515	GW	JG/JZ	X	X	X	X	X	X	X	X		
-07	MW06	4/7/25	1445	GW	JG/JZ	X	X	X	X	X	X	X	X		
-07	MW06MS	4/7/25	1445	GW	JG/JZ	X	X	X	X	X	X	X	X		
-07	MW06MSD	4/7/25	1445	GW	JG/JZ	X	X	X	X	X	X	X	X		
-08	MW01-D	4/8/25	0910	GW	JG/JZ	X	X	X	X	X	X	X	X		
-09	MW02-I	4/8/25	0950	GW	JG/JZ	X	X	X	X	X	X	X	X		
-10	FIELD BLANK	4/8/25	1015	W	JG/JZ	X	X	X	X	X	X	X	X		
-11	MW02-D	4/8/25	1055	GW	JG/JZ	X	X	X	X	X	X	X	X		

Container Type: V | A | A | A | P | P | A | P
Preservative: HCl | A | A | A | C | A | A | A

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; K/E = Zn Ac/NaOH; O = Other

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	4/8/25 1245		4/8/25 12:45
	4/8/25 1725		4/8/25 18:41
	4/9/25		4/9/25 0228
	4/9/25		04/09/25 0400

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581 — 8 Walkup Dr. — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA 02048 — 320 Forbes Blvd — TEL: 508-822-9300 — FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 2

Date Rec'd in Lab: 4/9/25

ALPHA Job #: L2521121

Client Information
Client: Castleton Env
Address: 70 West Main St Babylon NY
Phone: 631-482-1618
Fax:
Email: jessica@castletonenv.com

Project Information
Project Name: ZDEZ2403
Project Location: Stanley Ave
Project #: ZDEZ2403
(Use Project name as Project #) [X]
Project Manager: Jessica Ferngren
ALPHAQuote #:

Turn-Around Time
Standard [X] Due Date:
Rush (only if pre approved) [ ] # of Days:

Deliverables
[ ] ASP-A [ ] ASP-B
[ ] EQuIS (1 File) [ ] EQuIS (4 File)
[ ] Other

Regulatory Requirement
[X] NY TOGS
[X] AWQ Standards
[ ] NY Restricted Use
[ ] NY Unrestricted Use
[ ] NYC Sewer Discharge
[ ] NY Part 375
[ ] NY CP-51
[ ] Other

Billing Information
[X] Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
[ ] NJ [ ] NY
[ ] Other:

These samples have been previously analyzed by Alpha [ ]

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
[ ] Done
[ ] Lab to do
Preservation
[X] Lab to do
(Please Specify below)
FILTER DISSOLVED METALS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TCL VOCs 8260	ANYTCL SVOCs 8270	TCL PEST	TCL PCBS	TOTAL TAL Metals	Dissolved TAL Metals	1,4 Dioxane	PFAS-NY 1633	Sample Specific Comments	Total Bottle
2121-01	MW01-I	4/8/25	1040	GW	JB/KR	X	X	X	X	X	X	X	X		
02	TRIP BLANK	3/21/25				X									
03	TRIP BLANK 2	3/21/25				X									

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code:
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	V	A	A	A	P	P	A	P	
Preservative	B	A	A	A	C	A	A	A	

Relinquished By:	Date/Time	Received By:	Date/Time
	4/8/25 1245		4/8/25 1245
	4/8/25 1720		4/8/25 1845
	4/8/25		4/8/25 2230
	4/9/25 0100		04/09/25 0100

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Results Summary
Form 1
Volatile Organics by GC/MS

Client	: Castleton Environmental, Inc.	Lab Number	: L2521121
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2521121-10	Date Collected	: 04/08/25 10:15
Client ID	: FIELD BLANK	Date Received	: 04/08/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/17/25 13:35
Sample Matrix	: WATER	Dilution Factor	: 1
Analytical Method	: 1,8260D	Analyst	: MCM
Lab File ID	: J250417A17	Instrument ID	: JACK
Sample Amount	: 10 ml	GC Column	: RTX-502.2
Level	: LOW	%Solids	: N/A
Extract Volume (MeOH)	: N/A	Injection Volume	: N/A

		ug/L			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
75-00-3	Chloroethane	ND	2.5	0.70	U
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	U
156-60-5	trans-1,2-Dichloroethene	ND	2.5	0.70	U
79-01-6	Trichloroethene	ND	0.50	0.18	U
95-50-1	1,2-Dichlorobenzene	ND	2.5	0.70	U
541-73-1	1,3-Dichlorobenzene	ND	2.5	0.70	U
106-46-7	1,4-Dichlorobenzene	ND	2.5	0.70	U
1634-04-4	Methyl tert butyl ether	ND	2.5	0.17	U
179601-23-1	p/m-Xylene	ND	2.5	0.70	U
95-47-6	o-Xylene	ND	2.5	0.70	U
1330-20-7	Xylenes, Total	ND	2.5	0.70	U
156-59-2	cis-1,2-Dichloroethene	ND	2.5	0.70	U
540-59-0	1,2-Dichloroethene, Total	ND	2.5	0.70	U
74-95-3	Dibromomethane	ND	5.0	1.0	U
96-18-4	1,2,3-Trichloropropane	ND	2.5	0.70	U
107-13-1	Acrylonitrile	ND	5.0	1.5	U
100-42-5	Styrene	ND	2.5	0.70	U
75-71-8	Dichlorodifluoromethane	ND	5.0	1.0	U
67-64-1	Acetone	2.1	5.0	1.5	J
75-15-0	Carbon disulfide	ND	5.0	1.0	U
78-93-3	2-Butanone	ND	5.0	1.9	U
108-05-4	Vinyl acetate	ND	5.0	1.0	U
108-10-1	4-Methyl-2-pentanone	ND	5.0	1.0	U
591-78-6	2-Hexanone	ND	5.0	1.0	U
74-97-5	Bromochloromethane	ND	2.5	0.70	U

Results Summary
Form 1
Semivolatile Organics by GC/MS

Client	: Castleton Environmental, Inc.	Lab Number	: L2521121
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2521121-10	Date Collected	: 04/08/25 10:15
Client ID	: FIELD BLANK	Date Received	: 04/08/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/15/25 05:50
Sample Matrix	: WATER	Date Extracted	: 04/11/25
Analytical Method	: 1,8270E	Dilution Factor	: 1
Lab File ID	: 21121-10	Analyst	: SLR
Sample Amount	: 100 ml	Instrument ID	: SV112
Extraction Method	: EPA 3510C	GC Column	: RTX5-MS
Extract Volume	: 1000 uL	%Solids	: N/A
GPC Cleanup	: N	Injection Volume	: 1 uL

		ug/L			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	0.98	U
111-44-4	Bis(2-chloroethyl)ether	ND	2.0	0.39	U
95-50-1	1,2-Dichlorobenzene	ND	2.0	0.33	U
541-73-1	1,3-Dichlorobenzene	ND	2.0	0.32	U
106-46-7	1,4-Dichlorobenzene	ND	2.0	0.39	U
91-94-1	3,3'-Dichlorobenzidine	ND	5.0	1.8	U
121-14-2	2,4-Dinitrotoluene	ND	5.0	0.54	U
606-20-2	2,6-Dinitrotoluene	ND	5.0	0.84	U
7005-72-3	4-Chlorophenyl phenyl ether	ND	2.0	0.39	U
101-55-3	4-Bromophenyl phenyl ether	ND	2.0	0.24	U
108-60-1	Bis(2-chloroisopropyl)ether	ND	2.0	0.40	U
111-91-1	Bis(2-chloroethoxy)methane	ND	5.0	0.84	U
77-47-4	Hexachlorocyclopentadiene	ND	20	1.2	U
78-59-1	Isophorone	ND	5.0	0.86	U
98-95-3	Nitrobenzene	ND	2.0	0.20	U
86-30-6	NDPA/DPA	ND	2.0	0.92	U
621-64-7	n-Nitrosodi-n-propylamine	ND	5.0	0.91	U
117-81-7	Bis(2-ethylhexyl)phthalate	3.1	3.0	1.4	
85-68-7	Butyl benzyl phthalate	ND	5.0	2.6	U
84-74-2	Di-n-butylphthalate	ND	5.0	0.96	U
117-84-0	Di-n-octylphthalate	ND	5.0	2.3	U
84-66-2	Diethyl phthalate	ND	5.0	0.76	U

Form 1
METALS

Client	: Castleton Environmental, Inc.	Lab Number	: L2521121
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2521121-10	Date Collected	: 04/08/25 10:15
Client ID	: FIELD BLANK	Date Received	: 04/08/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/15/25 15:18
Sample Matrix	: WATER	Dilution Factor	: 1
Analytical Method	: 1,6020B	Analyst	: NTB
Lab File ID	: WG2053865.pdf	Instrument ID	: ICPMSQ2
Sample Amount	: 50ml	%Solids	: N/A
Digestion Method	: EPA 3005A	Date Digested	: 04/13/25

		mg/l			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
7429-90-5	Aluminum, Total	0.00664	0.0100	0.00327	J
7440-36-0	Antimony, Total	ND	0.00400	0.00042	U
7440-38-2	Arsenic, Total	ND	0.00050	0.00016	U
7440-39-3	Barium, Total	0.00027	0.00050	0.00017	J
7440-41-7	Beryllium, Total	ND	0.00050	0.00010	U
7440-43-9	Cadmium, Total	ND	0.00020	0.00005	U
7440-70-2	Calcium, Total	0.0894	0.100	0.0394	J
7440-47-3	Chromium, Total	ND	0.00100	0.00017	U
7440-48-4	Cobalt, Total	ND	0.00050	0.00016	U
7440-50-8	Copper, Total	ND	0.00100	0.00038	U
7439-89-6	Iron, Total	ND	0.0500	0.0191	U
7439-92-1	Lead, Total	ND	0.00100	0.00034	U
7439-95-4	Magnesium, Total	ND	0.0700	0.0242	U
7439-96-5	Manganese, Total	ND	0.00100	0.00044	U
7440-02-0	Nickel, Total	ND	0.00200	0.00055	U
7440-09-7	Potassium, Total	ND	0.100	0.0309	U
7782-49-2	Selenium, Total	ND	0.00500	0.00173	U
7440-22-4	Silver, Total	ND	0.00040	0.00016	U
7440-23-5	Sodium, Total	ND	0.500	0.0293	U
7440-28-0	Thallium, Total	ND	0.00100	0.00014	U
7440-62-2	Vanadium, Total	ND	0.00500	0.00157	U
7440-66-6	Zinc, Total	0.00905	0.01000	0.00341	J

Form 1
METALS

Client	: Castleton Environmental, Inc.	Lab Number	: L2521121
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Lab ID	: L2521121-10	Date Collected	: 04/08/25 10:15
Client ID	: FIELD BLANK	Date Received	: 04/08/25
Sample Location	: STANLEY AVE	Date Analyzed	: 04/15/25 15:43
Sample Matrix	: WATER	Dilution Factor	: 1
Analytical Method	: 1,6020B	Analyst	: BLR
Lab File ID	: WG2053862.pdf	Instrument ID	: ICPMSQ3
Sample Amount	: 50ml	%Solids	: N/A
Digestion Method	: EPA 3005A	Date Digested	: 04/15/25

		mg/l			
CAS NO.	Parameter	Results	RL	MDL	Qualifier
7429-90-5	Aluminum, Dissolved	0.00450	0.0100	0.00327	J
7440-36-0	Antimony, Dissolved	ND	0.00400	0.00042	U
7440-38-2	Arsenic, Dissolved	ND	0.00050	0.00016	U
7440-39-3	Barium, Dissolved	ND	0.00050	0.00017	U
7440-41-7	Beryllium, Dissolved	ND	0.00050	0.00010	U
7440-43-9	Cadmium, Dissolved	ND	0.00020	0.00005	U
7440-70-2	Calcium, Dissolved	0.0705	0.100	0.0394	J
7440-47-3	Chromium, Dissolved	ND	0.00100	0.00017	U
7440-48-4	Cobalt, Dissolved	ND	0.00050	0.00016	U
7440-50-8	Copper, Dissolved	ND	0.00100	0.00038	U
7439-89-6	Iron, Dissolved	ND	0.0500	0.0191	U
7439-92-1	Lead, Dissolved	ND	0.00100	0.00034	U
7439-95-4	Magnesium, Dissolved	ND	0.0700	0.0242	U
7439-96-5	Manganese, Dissolved	ND	0.00100	0.00044	U
7440-02-0	Nickel, Dissolved	ND	0.00200	0.00055	U
7440-09-7	Potassium, Dissolved	ND	0.100	0.0309	U
7782-49-2	Selenium, Dissolved	ND	0.00500	0.00173	U
7440-22-4	Silver, Dissolved	ND	0.00040	0.00016	U
7440-23-5	Sodium, Dissolved	ND	0.500	0.0293	U
7440-28-0	Thallium, Dissolved	ND	0.00100	0.00014	U
7440-62-2	Vanadium, Dissolved	ND	0.00500	0.00157	U
7440-66-6	Zinc, Dissolved	ND	0.01000	0.00341	U

PROJECT ZDEZ2403
DATA USABILITY SUMMARY REPORT
March 26, 2025 Soil Vapor and Indoor Air Sampling
Lab Report # L2518580

This data usability summary report (DUSR) was prepared in accordance with Appendix 2B of New York State Department of Environmental Conservation (NYSDEC) DER-10 using the entire original laboratory report, including the sample data summary report and the extended data package. The sampling event included nine primary environmental soil vapor, indoor air, and outdoor air samples and an associated quality assurance/quality control (QA/QC) sample collected on March 26, 2025.

Sample Collection

The samples were collected in labelled laboratory-provided sample containers (certified Summa canisters); no issues with sample containers or labeling were reported by the laboratory. All the sample Summa canisters exhibited measurable vacuums at the end of the sampling period. All flow controllers and air canister certification results passed their respective laboratory QA/QC checks. Sampling procedures, including collection of field QA/QC samples, were reported to have been in accordance with the procedures presented in the NYSDEC-approved Quality Assurance Project Plan (January 2025, revised March 2025 for this project). All sample collection was conducted under Chain of Custody (COC) procedures.

A duplicate QA/QC sample (DUP) was collected to evaluate field sampling methods and laboratory procedures.

Sample Analyses

The samples were transmitted to and analysed by Alpha Analytical (now Pace Analytical Services) at their Mansfield, MA facility, which is New York State Department of Health-certified and National Environmental Laboratory Accreditation Program (NELAP)-certified for the analyses performed. The samples were prepared and analysed for volatile organic compounds (VOCs) in accordance with EPA Method TO-15 (TO-15-LL and/or TO-15-SIM). The analytical methods and analytes are appropriate for the intended use of the data. The sample holding times were met and no problems with sample receipt or handling were reported by the laboratory.

The samples were received on March 27, 2025 and arrived in good condition. Soil vapor and air samples collected in Summa canisters do not require thermal preservation.

Several samples required dilution due to elevated concentrations of target compounds in the samples. The affected samples include SC-SSV01, SC-SSV02, SC-SSV03, and SC-SSV04. The results for these samples have elevated detection limits.

The lab report was amended to report to the Method Detection Limit (MDL) as per client request. Results between the MDL and Reporting Limit (RL) were J-qualified.

FPM

QA/QC Results

Canister Certifications

The canister batch certification results were checked to evaluate if cross-contamination from the sample canisters may present an issue. No VOCs were detected in the tested canisters, indicating that sample cross-contamination from the canisters is unlikely to present a concern.

Internal Standard Responses

Internal standard responses in each of the samples, including the lab QC samples, were within acceptance limits, indicating that the data are anticipated to be accurate.

Trip Blank Samples

A trip blank sample was not utilized as part of the project. Trip blank samples are not typically utilized for this type of analyses and were not included in the NYSDEC-approved QAPP for the project.

Field Duplicate Samples

A field blind duplicate sample was collected and utilized to evaluate the precision of the laboratory analyses. The results from the field duplicate sample (DUP) and the associated parent sample (SC-IAQ03) are very similar for the VOCs that were detected. Based on the duplicate sample results, the laboratory results are likely to be precise.

Laboratory Duplicate Sample

An aliquot of the SC-IAQ01 primary sample was tested by the lab as a duplicate sample to evaluate the precision of the laboratory analyses. The VOC results from the primary and duplicate samples are very similar for the VOCs that were detected, resulting in relative percent differences (RPDs) that were all below the control limits. Based on these results, the laboratory data are anticipated to be precise. No corrective actions were required.

Method Blank Samples

Two method blank (MB) samples were analysed by the laboratory to evaluate for the potential for cross contamination associated with the sample preparation and analysis. The MB results did not show concentrations of analytes above their method detection limits (MDLs) or the reporting limits (RLs). Based upon the MB data, cross contamination associated with sample preparation and analysis does not appear to present a concern.

Laboratory Control Samples

Laboratory control samples (LCSs) were used by the laboratory to verify the accuracy of the analyses. Two LCSs were run and all the percent recoveries (%Rs) were within limits for all analytes. Based on these results, the results for the associated samples (all the primary environmental samples in this dataset) are anticipated to be accurate.

Initial Calibration Verification

Initial calibration verification standards (ICVs) are midrange calibration standards that are

analysed to verify that the calibration of the analytical system is acceptable prior to testing the environmental samples. The ICV results were reviewed and no issues were noted.

Continuing Calibration Verification

Continuing calibration verification standards (CCVs) are midrange calibration standards that are analysed to verify that the calibration of the analytical system is still acceptable and instrument calibration drift has not occurred.

- The CCV associated with the indoor air samples SC-IAQ01, SC-IAQ02, and SC-IAQ03 recovered below the acceptance limit for acetone (biased low). All acetone detections in these samples should be considered biased low. All U-qualified results (none in these samples) should be J-qualified.

- The CCV associated with the remaining primary environmental samples exceeded the recovered below the acceptance limit for acetone (biased low). All acetone detections in these samples should be considered biased low. All U-qualified results (samples SC-SSV01 and SC-SSV04) should be J-qualified. The provided data table has been annotated accordingly.

Questions and Responses as per DER-10

1. Is the data package complete as defined under the current requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

   The data package is complete. The external and internal chain of custody forms are present and complete. The case narrative and sample analysis summaries are present and complete. The analytical QA/QC summary forms, including internal standard response forms, duplicate forms, IDL forms, initial and continuing calibration summary forms, standards raw data, tuning criteria report, and MB data are all present and complete. The data report forms, including sample prep logs, injection logs, and examples of the calculations used to determine the sample concentrations are all present and complete. The raw data used to identify and quantify the contract-specified analytes are present and complete.

2. Have all holding times been met?

   All samples were received and analysed within the EPA-recommended holding time for the analyses performed.

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, Internal standard response recoveries, spike recoveries, replicate analyses, laboratory controls and sample data, fall within the protocol-required limits and specifications?

   No – Although the majority of QC data were found to fall within the protocol-required limits and specifications, minor exceptions were noted above; however, these exceptions do not appear to significantly affect the data set.

4. Have all of the data been generated using established and agreed-upon analytical protocols?

Yes - all the data were generated using the analytical methodologies included in the NYSDEC-approved QAPP.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

   Yes – a representative number of raw data results were compared with the reported data results to confirm that the reported analytical results (identification and quantification) are substantiated by the raw data.

6. Have the correct data qualifiers been used?

   Yes – results below the reporting limit and above the MDL or calibration range have been J-qualified, and the U qualifier was applied when analytes were not detected above the MDL (note: the U qualifier was omitted from the client's data table and replaced with an "ND" notation, as per client preference). No other qualifiers were indicated or applied.

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

   Yes – exceedances have been noted in the DUSR and the corresponding QC summary sheets are attached.

Conclusions

The soil vapor, indoor air, and ambient air samples were reported to have been collected in accordance with the NYSDEC-approved QAPP for this project. No field or laboratory conditions occurred that would result in non-valid analytical data other than as noted above. The data appear to be adequate for their intended purpose.

Attachments

Revised report



Pace Analytical Services

Laboratory Code: 11148

SDG Number: L2518580

The original project report/data package is held by Pace Analytical Services. This report/data package is paginated and should be reproduced only in its entirety. Pace Analytical Services holds no responsibility for results and/or data that are not consistent with the original.

Project Name: ZDEZ2403
Project Number: ZDEZ2403

Lab Number: L2518580
Report Date: 04/18/25

Lab Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2518580-01	SC-IAQ01	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 17:07	03/27/25
L2518580-02	SC-IAQ02	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 17:09	03/27/25
L2518580-03	SC-IAQ03	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 18:09	03/27/25
L2518580-04	SC-IAQ04	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 18:01	03/27/25
L2518580-05	SC-SSV01	SOIL_VAPOR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 17:17	03/27/25
L2518580-06	SC-SSV02	SOIL_VAPOR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 18:18	03/27/25
L2518580-07	SC-SSV03	SOIL_VAPOR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 18:13	03/27/25
L2518580-08	SC-SSV04	SOIL_VAPOR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 17:57	03/27/25
L2518580-09	SC-OAQ01	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 15:34	03/27/25
L2518580-10	DUP	AIR	655-671 STANLEY AVE, BROOKLYN, NY	03/26/25 20:00	03/27/25

Project Name:	ZDEZ2403	**Lab Number:**	L2518580
Project Number:	ZDEZ2403	**Report Date:**	04/18/25

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Pace Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Pace's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Pace to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

April 18, 2025: The report has been amended to report data to the Method Detection Limit per the request of the client.

Volatile Organics in Air

Canisters were released from the laboratory on March 21, 2025. The canister certification data is provided as an addendum.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

L2518580-05D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

L2518580-06D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

L2518580-07D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

L2518580-08D: The sample has elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample.

The WG2052784-2 CC recovery associated with L2518580-01 through -03 is below the acceptance limit for Acetone. All samples associated with this CC that have reportable amounts of this analyte will be reported with low bias.

Case Narrative (continued)

The WG2053046-2 CC recovery associated with L2518580-04, -05D, -06D, -07D, -08D, -09, and -10 is below the acceptance limit for Acetone. All samples associated with this CC that have reportable amounts of this analyte will be reported with low bias.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Report Date: 04/18/25

Title: Technical Director/Representative

DATA PACKAGE GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

ND or U - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Sample Delivery Group Summary

Pace Job Number : L2518580

Account Name : Castleton Environmental, Inc.
Project Number : ZDEZ2403
Project Name : ZDEZ2403

Received : 27-MAR-2025
Reviewer : Christopher J Anderson

Delivery Information

Samples Delivered By : Pace Courier

Chain of Custody : Present

Cooler Information

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
NA	Present/Intact/NA			

Condition Information

1) All samples on COC received?	YES
2) Extra samples received?	NO
3) Are there any sample container discrepancies?	NO
4) Are there any discrepancies between COC & sample labels? L2518580-03: FC ID #02646 vs. FC ID #02696	YES
5) Are samples in appropriate containers for requested analysis?	YES
6) Are samples properly preserved for requested analysis?	YES
7) Are samples within holding time for requested analysis?	YES
8) All sampling equipment returned?	YES

Volatile Organics/VPH

1) Reagent Water Vials Frozen by Client?	NA

PACE ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT
Apr 18 2025, 03:46 pm

Login Number: L2518580
Account: CASTLETONENV Castleton Environmental, Inc.Project: ZDEZ2403
Received: 27MAR25 Due Date: 10APR25

Sample #	Client ID	Mat	PR	Collected
L2518580-01	SC-IAQ01	10	S0	26MAR25 17:07
TO15 SIM for 7 NYS DMCs ASP-B Package Due Date: 04/10/25				
ASP-B,CAN-RENT,ENVIMPACT-FEE,FLOW-RENT,TO15-LL,TO15-SIM				
L2518580-02	SC-IAQ02	10	S0	26MAR25 17:09
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL,TO15-SIM				
L2518580-03	SC-IAQ03	10	S0	26MAR25 18:09
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL,TO15-SIM				
L2518580-04	SC-IAQ04	10	S0	26MAR25 18:01
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL,TO15-SIM				
L2518580-05	SC-SSV01	11	S0	26MAR25 17:17
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL				
L2518580-06	SC-SSV02	11	S0	26MAR25 18:18
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL				
L2518580-07	SC-SSV03	11	S0	26MAR25 18:13
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				

PACE ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT
Apr 18 2025, 03:46 pm

Login Number: L2518580
Account: CASTLETONENV Castleton Environmental, Inc.Project: ZDEZ2403
Received: 27MAR25 Due Date: 10APR25

Sample #	Client ID	Mat	PR	Collected
CAN-RENT,FLOW-RENT,TO15-LL				
L2518580-08	SC-SSV04	11	SO	26MAR25 17:57
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL				
L2518580-09	SC-OAQ01	10	SO	26MAR25 15:34
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL,TO15-SIM				
L2518580-10	DUP	10	SO	26MAR25 20:00
TO15 SIM for 7 NYS DMCs Package Due Date: 04/10/25				
CAN-RENT,FLOW-RENT,TO15-LL,TO15-SIM				

Logged By: Christopher J Anderson

Project Name: ZDEZ2403

Project Number: ZDEZ2403

Lab Number: L2518580

Report Date: 04/15/25

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L2518580-01	SC-IAQ01	01484	Flow 1	03/21/25	508922		-	-	-	Pass	10.0	11.4	13
L2518580-01	SC-IAQ01	5308	6.0L Can	03/21/25	508922	L2515761-10	Pass	-29.0	-4.6	-	-	-	-
L2518580-02	SC-IAQ02	01636	Flow 1	03/21/25	508922		-	-	-	Pass	10.0	11.0	10
L2518580-02	SC-IAQ02	1984	6.0L Can	03/21/25	508922	L2515761-05	Pass	-29.4	-4.1	-	-	-	-
L2518580-03	SC-IAQ03	02696	Flow 4	03/21/25	508922		-	-	-	Pass	10.2	11.0	8
L2518580-03	SC-IAQ03	2004	6.0L Can	03/21/25	508922	L2515761-05	Pass	-29.4	-4.7	-	-	-	-
L2518580-04	SC-IAQ04	02634	Flow 4	03/21/25	508922		-	-	-	Pass	10.0	10.3	3
L2518580-04	SC-IAQ04	3482	6.0L Can	03/21/25	508922	L2515761-10	Pass	-29.0	-4.4	-	-	-	-
L2518580-05	SC-SSV01	01401	Flow 4	03/21/25	508922		-	-	-	Pass	10.0	10.4	4
L2518580-05	SC-SSV01	3049	6.0L Can	03/21/25	508922	L2515761-05	Pass	-29.4	-7.7	-	-	-	-
L2518580-06	SC-SSV02	01710	Flow 4	03/21/25	508922		-	-	-	Pass	10.1	10.5	4
L2518580-06	SC-SSV02	1832	6.0L Can	03/21/25	508922	L2515761-10	Pass	-29.0	-3.7	-	-	-	-
L2518580-07	SC-SSV03	02697	Flow 4	03/21/25	508922		-	-	-	Pass	10.0	10.5	5
L2518580-07	SC-SSV03	5460	6.0L Can	03/21/25	508922	L2515761-10	Pass	-29.2	-4.5	-	-	-	-
L2518580-08	SC-SSV04	0798	Flow 1	03/21/25	508922		-	-	-	Pass	10.1	10.5	4

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L2518580-08	SC-SSV04	3120	6.0L Can	03/21/25	508922	L2515761-05	Pass	-29.3	-3.7	-	-	-	-
L2518580-09	SC-OAQ01	01365	Flow 4	03/21/25	508922		-	-	-	Pass	10.1	11.2	10
L2518580-09	SC-OAQ01	2663	6.0L Can	03/21/25	508922	L2515761-10	Pass	-29.2	-4.2	-	-	-	-
L2518580-10	DUP	0120	Flow 5	03/21/25	508922		-	-	-	Pass	9.5	9.7	2
L2518580-10	DUP	3067	6.0L Can	03/21/25	508922	L2515761-05	Pass	-29.4	-5.7	-	-	-	-

AIR ANALYSIS

PAGE _____ OF _____

ALPHA ANALYTICAL — CHAIN OF CUSTODY

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 3/28/25

ALPHA Job #: L2518580

Client Information

Client: Castleton Environmental
Address: 70 W. Main St
Babylon, NY
Phone: 631-482-1818
Fax:
Email: JessicaF@castletonenv.com
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: ZDEZ2403
Project Location: 655-671 Stanley Ave, Brooklyn, NY
Project #: ZDEZ2403
Project Manager: Jessica Farragen
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☒ ADEx
Criteria Checker: NY
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☒ Additional Deliverables: NYS CAT B Deliverables
Report to: (if different than Project Manager) Jessica Farragen

Billing Information

☐ Same as Client info PO #:
Quote: 00171381

Regulatory Requirements/Report Limits

State/Fed	Program	Res / Comm

Other Project Specific Requirements/Comments: NYS CAT B DELIVERABLES

Project-Specific Target Compound List: ☐

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	COLLECTION End Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I.D. Can	I.D. Flow Controller	ANALYSIS TO-15	TO-15 SIM	APH	Fixed Gases	Sulfides & Mercaptans by TO-15	☐	Sample Comments (i.e. PID)
18580-01	SC-IA001	3/26/25	09:07	17:07	-29.83	-5.45	AA	JZ	6L	5308	01484	X	X					
02	SC-IA002		09:11	17:09	-30.43	-4.84	AA	JZ	6L	1984	01636	X	X					
03	SC-IA003		10:07	18:09	-29.38	-7.74	AA	JZ	6L	2004	02646	X	X					
04	SC-IA004		10:01	18:01	-29.48	-5.29	AA	JZ	6L	3482	02634	X	X					
05	SC-SSV01		09:10	17:17	-30.36	-8.09	SV	JZ	6L	3049	01401	X	X					
06	SC-SSV02		10:21	18:18	-30.91	-4.56	SV	JZ	6L	1832	01710	X	X					
07	SC-SSV03		10:11	18:13	-30.58	-6.06	SV	JZ	6L	5960	02697	X	X					
08	SC-SSV04		10:03	17:57	-30.13	-4.74	SV	JZ	6L	3120	0799	X	[illegible]					
09	SC-OA001		8:57	15:34	-30.45	-5.00	AA	JZ	6L	2665	01365	X	X					
10	DUP		12:00	20:00	-30.68	-7.14	AA	JZ	6L	3067	0120	X	X					

*SAMPLE MATRIX CODES
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	3/28/25 1327	[signature]	3/27/25 1327
MCA Pace	3-27-25 1640	Anthony Green	MAR 27 2025
Anthony Green	3/28/25 0700		3/28/25 0745

Form No: 101-02 Rev: (27-Sep-19)

Calibration Verification Summary
Form 7
Air Volatiles

Client	: Castleton Environmental, Inc.		Lab Number	: L2518580	
Project Name	: ZDEZ2403		Project Number	: ZDEZ2403	
Instrument ID	: AIRLAB26		Calibration Date	: 04/12/25 14:13	
Lab File ID	: R262900		Init. Calib. Date(s)	: 04/03/25	04/03/25
Sample No	: WG2053046-2		Init. Calib. Times	: 02:36	06:40
Channel	:				

ccv

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
bromochloromethane	1	1	-	0	30	92	0
chlorodifluoromethane	0.387	0.401	-	-3.6	30	81	0
propylene	0.576	0.509	-	11.6	30	84	0
propane	0.352	0.294	-	16.5	30	86	0
dichlorodifluoromethane	2.163	2.119	-	2	30	93	0
chloromethane	0.641	0.589	-	8.1	30	90	0
Freon-114	2.25	2.474	-	-10	30	105	0
methanol	0.135	0.161	-	-19.3	30	110	0
vinyl chloride	0.803	0.799	-	0.5	30	97	0
1,3-butadiene	0.58	0.534	-	7.9	30	94	0
butane	0.937	0.857	-	8.5	30	90	0
bromomethane	0.833	0.931	-	-11.8	30	107	0
chloroethane	0.467	0.459	-	1.7	30	99	0
ethanol	0.336	0.273	-	18.8	30	78	0
dichlorofluoromethane	1.932	1.822	-	5.7	30	94	0
vinyl bromide	0.896	1.131	-	-26.2	30	128	0
acrolein	0.338	0.31	-	8.3	30	86	0
acetone	0.824	0.558	-	32.3*	30	66	0
acetonitrile	0.581	0.534	-	8.1	30	96	0
trichlorofluoromethane	1.978	2.188	-	-10.6	30	105	0
isopropyl alcohol	0.983	0.794	-	19.2	30	86	0
acrylonitrile	0.609	0.607	-	0.3	30	94	0
pentane	1.078	1.135	-	-5.3	30	93	0
ethyl ether	0.52	0.507	-	2.5	30	95	0
1,1-dichloroethene	1.183	1.388	-	-17.3	30	105	0
tertiary butyl alcohol	1.471	1.34	-	8.9	30	95	0
methylene chloride	0.681	0.739	-	-8.5	30	105	0
3-chloropropene	0.711	0.752	-	-5.8	30	103	0
carbon disulfide	2.1	2.557	-	-21.8	30	115	0
Freon 113	1.704	1.938	-	-13.7	30	107	0
trans-1,2-dichloroethene	0.985	1.139	-	-15.6	30	109	0
1,1-dichloroethane	1.343	1.449	-	-7.9	30	103	0
MTBE	2.095	2.331	-	-11.3	30	106	0
vinyl acetate	1.369	1.01	-	26.2	30	70	0
2-butanone	1.357	1.296	-	4.5	30	95	0
cis-1,2-dichloroethene	1.13	1.093	-	3.3	30	92	0
Ethyl Acetate	0.301	0.451	-	-49.8*	30	130	0
chloroform	1.826	1.844	-	-1	30	95	0
Tetrahydrofuran	0.659	0.875	-	-32.8*	30	130	0
2,2-dichloropropane	1.537	1.373	-	10.7	30	85	0
1,2-dichloroethane	1.076	1.049	-	2.5	30	94	0
1,4-difluorobenzene	1	1	-	0	30	91	0
hexane	0.295	0.352	-	-19.3	30	117	0

* Value outside of QC limits.

Calibration Verification Summary
Form 7
Air Volatiles

Client	: Castleton Environmental, Inc.	Lab Number	: L2518580
Project Name	: ZDEZ2403	Project Number	: ZDEZ2403
Instrument ID	: AIRLAB26	Calibration Date	: 04/11/25 13:42
Lab File ID	: R262871	Init. Calib. Date(s)	: 04/03/25 04/03/25
Sample No	: WG2052784-2	Init. Calib. Times	: 02:36 06:40
Channel	:		

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
bromochloromethane	1	1	-	0	30	94	0
chlorodifluoromethane	0.387	0.797	-	-105.9*	30	166	0
propylene	0.576	0.468	-	18.7	30	80	0
propane	0.352	0.317	-	9.9	30	95	0
dichlorodifluoromethane	2.163	2.158	-	0.2	30	98	0
chloromethane	0.641	0.591	-	7.8	30	93	0
Freon-114	2.25	2.446	-	-8.7	30	107	0
methanol	0.135	0.164	-	-21.5	30	116	0
vinyl chloride	0.803	0.784	-	2.4	30	97	0
1,3-butadiene	0.58	0.527	-	9.1	30	96	0
butane	0.937	0.843	-	10	30	91	0
bromomethane	0.833	0.911	-	-9.4	30	107	0
chloroethane	0.467	0.456	-	2.4	30	101	0
ethanol	0.336	0.289	-	14	30	85	0
dichlorofluoromethane	1.932	1.577	-	18.4	30	84	0
vinyl bromide	0.896	1.112	-	-24.1	30	129	0
acrolein	0.338	0.302	-	10.7	30	86	0
acetone	0.824	0.552	-	33*	30	67	0
acetonitrile	0.581	0.516	-	11.2	30	95	0
trichlorofluoromethane	1.978	2.118	-	-7.1	30	105	0
isopropyl alcohol	0.983	0.822	-	16.4	30	92	0
acrylonitrile	0.609	0.546	-	10.3	30	87	0
pentane	1.078	1.134	-	-5.2	30	95	0
ethyl ether	0.52	0.488	-	6.2	30	94	0
1,1-dichloroethene	1.183	1.365	-	-15.4	30	106	0
tertiary butyl alcohol	1.471	1.342	-	8.8	30	97	0
methylene chloride	0.681	0.733	-	-7.6	30	107	0
3-chloropropene	0.711	0.732	-	-3	30	103	0
carbon disulfide	2.1	2.453	-	-16.8	30	113	0
Freon 113	1.704	1.865	-	-9.4	30	106	0
trans-1,2-dichloroethene	0.985	1.107	-	-12.4	30	109	0
1,1-dichloroethane	1.343	1.394	-	-3.8	30	102	0
MTBE	2.095	2.273	-	-8.5	30	106	0
vinyl acetate	1.369	0.997	-	27.2	30	71	0
2-butanone	1.357	1.281	-	5.6	30	96	0
cis-1,2-dichloroethene	1.13	1.061	-	6.1	30	92	0
Ethyl Acetate	0.301	0.259	-	14	30	77	0
chloroform	1.826	1.813	-	0.7	30	96	0
Tetrahydrofuran	0.659	0.678	-	-2.9	30	104	0
2,2-dichloropropane	1.537	1.363	-	11.3	30	87	0
1,2-dichloroethane	1.076	1.044	-	3	30	96	0
1,4-difluorobenzene	1	1	-	0	30	93	0
hexane	0.295	0.353	-	-19.7	30	120	0

* Value outside of QC limits.

	SAMPLE ID:	SC-IAQ01				SC-IAQ02				SC-IAQ03				DUP				SC-IAQ04				SC-OAQ01				SC-SSV01				SC-SSV02				SC-SSV03				SC-SSV04			
	LAB ID:	L2518580-01				L2518580-02				L2518580-03				L2518580-10				L2518580-04				L2518580-09				L2518580-05				L2518580-06				L2518580-07				L2518580-08			
	COLLECTION DATE:	3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025				3/26/2025			
	SAMPLE DEPTH:																																						
	SAMPLE MATRIX:	AIR				AIR				AIR				AIR				AIR				AIR				SOIL_VAPOR				SOIL_VAPOR				SOIL_VAPOR				SOIL_VAPOR			
ANALYTE	CAS	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
VOLATILE ORGANICS IN AIR																																							
1,1,1-Trichloroethane	71-55-6	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	3.43		3.41	1.05	ND		2.73	0.84	ND		4.96	1.52	ND		4.54	1.4
1,1,2,2-Tetrachloroethane	79-34-5	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		1.37	0.357	ND		4.29	1.11	ND		3.43	0.893	ND		6.24	1.62	ND		5.72	1.49
1,1,2-Trichloroethane	79-00-5	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		1.09	0.318	ND		3.41	0.993	ND		2.73	0.797	ND		4.96	1.44	ND		4.54	1.32
1,1-Dichloroethane	75-34-3	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		0.809	0.23	ND		2.53	0.72	ND		2.02	0.575	ND		3.68	1.04	ND		3.37	0.959
1,1-Dichloroethene	75-35-4	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	ND		2.48	0.706	ND		1.98	0.563	ND		3.6	1.02	ND		3.3	0.94
1,2,4-Trichlorobenzene	120-82-1	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		1.48	0.742	ND		4.64	2.32	ND		3.71	1.86	ND		6.75	3.37	ND		6.18	3.1
1,2,4-Trimethylbenzene	95-63-6	1.35		0.983	0.284	1.29		0.983	0.284	0.678	J	0.983	0.284	0.693	J	0.983	0.284	0.408	J	0.983	0.284	0.511	J	0.983	0.284	1.08	J	3.07	0.885	1.11	J	2.46	0.708	ND		4.47	1.29	ND		4.1	1.18
1,2-Dibromoethane	106-93-4	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		1.54	0.418	ND		4.8	1.31	ND		3.84	1.05	ND		6.99	1.9	ND		6.4	1.74
1,2-Dichlorobenzene	95-50-1	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		1.2	0.372	ND		3.76	1.16	ND		3.01	0.932	ND		5.47	1.69	ND		5.01	1.55
1,2-Dichloroethane	107-06-2	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		0.809	0.319	ND		2.53	0.996	ND		2.02	0.797	ND		3.68	1.45	ND		3.37	1.33
1,2-Dichloropropane	78-87-5	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		0.924	0.292	ND		2.89	0.91	ND		2.31	0.73	ND		4.2	1.33	ND		3.85	1.22
1,3,5-Trimethylbenzene	108-67-8	0.374	J	0.983	0.295	0.364	J	0.983	0.295	ND		0.983	0.295	ND		0.983	0.295	ND		0.983	0.295	ND		0.983	0.295	ND		3.07	0.924	ND		2.46	0.737	ND		4.47	1.34	ND		4.1	1.23
1,3-Butadiene	106-99-0	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		0.442	0.137	ND		1.38	0.427	ND		1.11	0.343	ND		2.01	0.622	ND		1.84	0.571
1,3-Dichlorobenzene	541-73-1	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		1.2	0.467	ND		3.76	1.46	ND		3.01	1.17	ND		5.47	2.12	ND		5.01	1.95
1,4-Dichlorobenzene	106-46-7	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		1.2	0.497	ND		3.76	1.55	ND		3.01	1.24	ND		5.47	2.25	ND		5.01	2.07
1,4-Dioxane	123-91-1	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		0.721	0.194	ND		2.25	0.605	ND		1.8	0.483	ND		3.28	0.879	ND		3	0.807
2,2,4-Trimethylpentane	540-84-1	0.873	J	0.934	0.323	0.654	J	0.934	0.323	0.341	J	0.934	0.323	0.406	J	0.934	0.323	ND		0.934	0.323	0.677	J	0.934	0.323	ND		2.92	1.01	ND		2.34	0.808	ND		4.25	1.47	ND		3.89	1.35
2-Butanone	78-93-3	1.41	J	1.47	0.292	1.33	J	1.47	0.292	0.776	J	1.47	0.292	0.841	J	1.47	0.292	0.714	J	1.47	0.292	3.1		1.47	0.292	ND		4.6	0.911	0.737	J	3.69	0.731	1.35	J	6.69	1.33	ND		6.13	1.22
2-Hexanone	591-78-6	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		0.82	0.374	ND		2.56	1.17	ND		2.05	0.934	ND		3.73	1.7	ND		3.41	1.56
3-Chloropropene	107-05-1	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		0.626	0.269	ND		1.96	0.842	ND		1.57	0.673	ND		2.85	1.22	ND		2.61	1.12
4-Ethyltoluene	622-96-8	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		0.983	0.272	ND		3.07	0.85	ND		2.46	0.678	ND		4.47	1.24	ND		4.1	1.14
4-Methyl-2-pentanone	108-10-1	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		2.05	0.779	ND		6.39	2.43	ND		5.12	1.95	ND		9.3	3.54	ND		8.52	3.25
Acetone	67-64-1	27.1		2.38	1.22	20.4		2.38	1.22	7.46		2.38	1.22	7.46		2.38	1.22	6.87		2.38	1.22	22.5		2.38	1.22	ND		7.41	3.82	12		5.94	3.06	22.1		10.8	5.56	ND		8.91	5.11
Benzene	71-43-2	0.7		0.639	0.205	0.645		0.639	0.205	0.476	J	0.639	0.205	0.511	J	0.639	0.205	0.476	J	0.639	0.205	0.872		0.639	0.205	ND		2	0.642	ND		1.6	0.514	ND		2.9	0.983	ND		2.66	0.856
Benzyl chloride	100-44-7	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		1.04	0.486	ND		3.24	1.52	ND		2.59	1.22	ND		4.71	2.21	ND		4.31	2.02
Bromodichloromethane	75-27-4	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		1.34	0.462	ND		4.19	1.44	ND		3.35	1.15	ND		6.09	2.1	ND		5.58	1.92
Bromoform	75-25-2	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		2.07	0.616	ND		6.46	1.92	ND		5.17	1.54	ND		9.4	2.8	ND		8.61	2.56
Bromomethane	74-83-9	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		0.777	0.212	ND		2.43	0.664	ND		1.94	0.532	ND		3.53	0.967	ND		3.23	0.885
Carbon disulfide	75-15-0	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		0.623	0.145	ND		1.95	0.452	ND		1.56	0.361	ND		2.83	0.657	ND		2.59	0.604
Carbon tetrachloride	56-23-5	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	ND		3.93	1.35	ND		3.15	1.08	ND		5.72	1.96	ND		5.24	1.8
Chlorobenzene	108-90-7	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		0.921	0.238	ND		2.88	0.741	ND		2.3	0.594	ND		4.19	1.08	ND		3.84	0.99
Chloroethane	75-00-3	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		0.528	0.171	ND		1.65	0.536	ND		1.32	0.427	ND		2.4	0.778	ND		2.2	0.712
Chloroform	67-66-3	0.669	J	0.977	0.27	0.615	J	0.977	0.27	ND		0.977	0.27	ND		0.977	0.27	0.772	J	0.977	0.27	ND		0.977	0.27	9.33		3.05	0.84	4.87		2.44	0.674	154		4.44	1.23	91.8		4.07	1.12
Chloromethane	74-87-3	1.1		0.413	0.119	1.07		0.413	0.119	1.11		0.413	0.119	1.01		0.413	0.119	0.981		0.413	0.119	1.12		0.413	0.119	ND		1.29	0.372	0.686	J	1.03	0.297	ND		1.88	0.541	ND		1.72	0.496
cis-1,2-Dichloroethene	156-59-2	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	ND		2.48	0.737	0.999	J	1.98	0.591	ND		3.6	1.07	ND		3.3	0.983
cis-1,3-Dichloropropene	10061-01-5	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		0.908	0.306	ND		2.84	0.958	ND		2.27	0.763	ND		4.13	1.39	ND		3.78	1.28
Cyclohexane	110-82-7	0.31	J	0.688	0.251	ND		0.688	0.251	ND		0.688	0.251	0.368	J	0.688	0.251	ND		0.688	0.251	0.286	J	0.688	0.251	ND		2.15	0.785	ND		1.72	0.626	ND		3.13	1.14	1.35	J	2.87	1.04
Dibromochloromethane	124-48-1	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		1.7	0.482	ND		5.32	1.51	ND		4.26	1.21	ND		7.74	2.19	ND		7.1	2.01
Dichlorodifluoromethane	75-71-8	2.18		0.989	0.374	2.29		0.989	0.374	2.26		0.989	0.374	2.25		0.989	0.374	2.18		0.989	0.374	2.23		0.989	0.374	2.49	J	3.09	1.17	2.3	J	2.47	0.935	2.02	J	4.49	1.7	2.26	J	4.12	1.56
Ethanol	64-17-5	108		9.42	3.28	62		9.42	3.28	13.8		9.42	3.28	19.6		9.42	3.28	11.6		9.42	3.28	10.9		9.42	3.28	ND		29.4	10.3	31.8		23.6	8.2	ND		42.8	14.9	ND		39.2	13.7
Ethyl Acetate	141-78-6	3.86		1.8	1.07	2.34		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07	ND		1.8	1.07	ND		5.62	3.34	ND		4.5	2.67	ND		8.18	4.86	ND		7.5	4.47
Ethylbenzene	100-41-4	0.56	J	0.869	0.25	0.578	J	0.869	0.25	ND		0.869	0.25	ND		0.869	0.25	ND		0.869	0.25	0.334	J	0.869	0.25	ND		2.71	0.782	ND		2.17	0.625	ND		3.95	1.13	ND		3.62	1.04
Freon-113	76-13-1	0.621	J	1.53	0.388	0.659	J	1.53	0.388	0.621	J	1.53	0.388	0.575	J	1.53	0.388	0.575	J	1.53	0.388	0.514	J	1.53	0.388	ND		4.79	1.21	ND		3.83	0.966	ND		6.97	1.76	ND		6.38	1.62
Freon-114	76-14-2	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		1.4	0.352	ND		4.37	1.1	ND		3.49	0.881	ND		6.35	1.6	ND		5.82	1.47
Heptane	142-82-5	1.97		0.82	0.339	1.84		0.82	0.339	0.5	J	0.82	0.339	0.631	J	0.82	0.339	0.93		0.82	0.339	0.57	J	0.82	0.339	ND		2.56	1.06	ND		2.05	0.848	ND		3.73	1.54	16.7		3.41	1.41
Hexachlorobutadiene	87-68-3	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		2.13	0.647	ND		6.67	2.03	ND		5.33	1.62	ND		9.7	2.94	ND		8.89	2.7
Isopropanol	67-63-0	17.3		2.46	0.669	6.64		2.46	0.669	8.04		2.46	0.669	2.8		2.46	0.669	8.43		2.46	0.669	6.61		2.46	0.669	19.5		7.67	2.09	42		6.15	1.67	6.02	J	11.2	3.05	ND		10.3	2.78
Methyl tert butyl ether	1634-04-4	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		0.721	0.162	ND		2.25	0.508	ND		1.8	0.404	ND		3.28	0.735	ND		3	0.678
Methylene chloride	75-09-2	0.677	J	1.74	0.434	0.681	J	1.74	0.434	0.677	J	1.74	0.434	0.636	J	1.74	0.434	0.73	J	1.74	0.434	0.691	J	1.74	0.434	ND		5.42	1.36	ND		4.34	1.08	ND		7.89	1.97	ND		7.23	1.81
n-Hexane	110-54-3	2.27		0.705	0.262	0.765		0.705	0.262	1.71		0.705	0.262	0.62	J	0.705	0.262	2.03		0.705	0.262	1.44		0.705	0.262	ND		2.2	0.818	6.94		1.76	0.656	ND		3.2	1.19	39.8		2.94	1.09
Naphthalene	91-20-3	ND		0.996	0.309	ND		0.996	0.309	0.346	J	0.996	0.309	0.582	J	0.996	0.309	ND		0.996	0.309	ND		0.996	0.309	ND		3.11	0.965	ND		2.49	0.776	ND		4.53	1.41	ND		4.15	1.29
o-Xylene	95-47-6	0.912		0.869	0.27	0.695		0.869	0.27	1.26		0.869	0.27	0.669	J	0.869	0.27	0.334	J	0.869	0.27	6.34		0.869	0.27	1.46	J	2.71	0.843	1.02	J	2.17	0.673	ND		3.95	1.22	1.34	J	3.62	1.12
p/m-Xylene	179601-23-1	2.29		1.74	0.543	2.27		1.74	0.543	0.99	J	1.74	0.543	0.856	J	1.74	0.543	0.712	J	1.74	0.543	1.28	J	1.74	0.543	ND		5.43	1.7	1.51	J	4.34	1.36	ND		7.91	2.47	ND		7.25	2.26
Styrene	100-42-5	0.353	J	0.852	0.254	0.336	J	0.852	0.254	0.656	J	0.852	0.254	0.307	J	0.852	0.254	ND		0.852	0.254	ND		0.852	0.254	ND		2.66	0.792	ND		2.13	0.634	ND		3.87	1.15	ND		3.55	1.06
Tertiary butyl Alcohol	75-65-0	ND		1.52	0.4	ND		1.52	0.4	ND		1.52	0.4	0.464	J	1.52	0.4	ND		1.52	0.4	0.731	J	1.52	0.4	ND		4.73	1.25	ND		3.79	1	ND		6.88	1.82	ND		6.31	1.67
Tetrachloroethene	127-18-4	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	1160		4.24	1.33	895		3.39	1.06	1630		6.16	1.93	1640		5.65	1.77
Tetrahydrofuran	109-99-9	0.596	J	1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		1.47	0.345	ND		4.6	1.08	ND		3.69	0.861	ND		6.69	1.57	ND		6.13	1.44
Toluene	108-88-3	7.99		0.754	0.327	10.6		0.754	0.327	1.64		0.754	0.327	1.6		0.754	0.327	0.991		0.754	0.327	1.47		0.754	0.327	1.68	J	2.36	1.02	3.39		1.88	0.818	ND		3.43	1.48	1.44	J	3.14	1.36
trans-1,2-Dichloroethene	156-60-5	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		0.793	0.299	ND		2.48	0.936	ND		1.98	0.749	ND		3.6	1.36	ND		3.3	1.25
trans-1,3-Dichloropropene	10061-02-6	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		0.908	0.355	ND		2.84	1.11	ND		2.27	0.89	ND		4.13	1.62	ND		3.78	1.48
Trichloroethene	79-01-6	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	11.5		3.36	0.919	83.8		2.69	0.736	10		4.89	1.34	74.7		4.48	1.23
Trichlorofluoromethane	75-69-4	1.28		1.12	0.442	1.26		1.12	0.442	1.25		1.12	0.442	1.3		1.12	0.442	1.28		1.12	0.442	1.3		1.12	0.442	1.4	J	3.51	1.38	1.36	J	2.81	1.11	ND		5.11	2.01	ND		4.68	1.84
Vinyl bromide	593-60-2	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		0.874	0.316	ND		2.73	0.988	ND		2.19	0.787	ND		3.97	1.43	ND		3.64	1.32
Vinyl chloride	75-01-4	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	-		-	-	ND		1.6	0.465	ND		1.28	0.373	ND		2.32	0.675	ND		2.13	0.619
VOLATILE ORGANICS IN AIR BY SIM																																							
1,1,1-Trichloroethane	71-55-6	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	ND		0.109	0.032	-		-	-	-		-	-	-		-	-	-		-	-
1,1-Dichloroethene	75-35-4	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	ND		0.079	0.031	-		-	-	-		-	-	-		-	-	-		-	-
Carbon tetrachloride	56-23-5	0.478		0.126	0.069	0.459		0.126	0.069	0.415		0.126	0.069	0.428		0.126	0.069	0.434		0.126	0.069	0.428		0.126	0.069	-		-	-	-		-	-	-		-	-	-		-	-
cis-1,2-Dichloroethene	156-59-2	0.091		0.079	0.04	0.099		0.079	0.04	ND		0.079	0.04	ND		0.079	0.04	0.297		0.079	0.04	ND		0.079	0.04	-		-	-	-		-	-	-		-	-	-		-	-
Tetrachloroethene	127-18-4	1.1		0.136	0.05	1.27		0.136	0.05	0.359		0.136	0.05	0.292		0.136	0.05	0.332		0.136	0.05	0.461		0.136	0.05	-		-	-	-		-	-	-		-	-	-		-	-
Trichloroethene	79-01-6	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	ND		0.107	0.032	-		-	-	-		-	-	-		-	-	-		-	-
Vinyl chloride	75-01-4	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	ND		0.051	0.023	-		-	-	-		-	-	-		-	-	-		-	-

* Comparison is not performed on parameters with non-numeric criteria.

NY-IAC-A-F: New York DOH Matrices A-F Indoor Air Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated February, 2024.
NY-SSC-A-F: New York DOH Matrices A-F Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated February, 2024.

CASTLETON ENVIRONMENTAL

APPENDIX J
SURROUNDING PROPERTIES ENVIRONMENTAL REPORTS

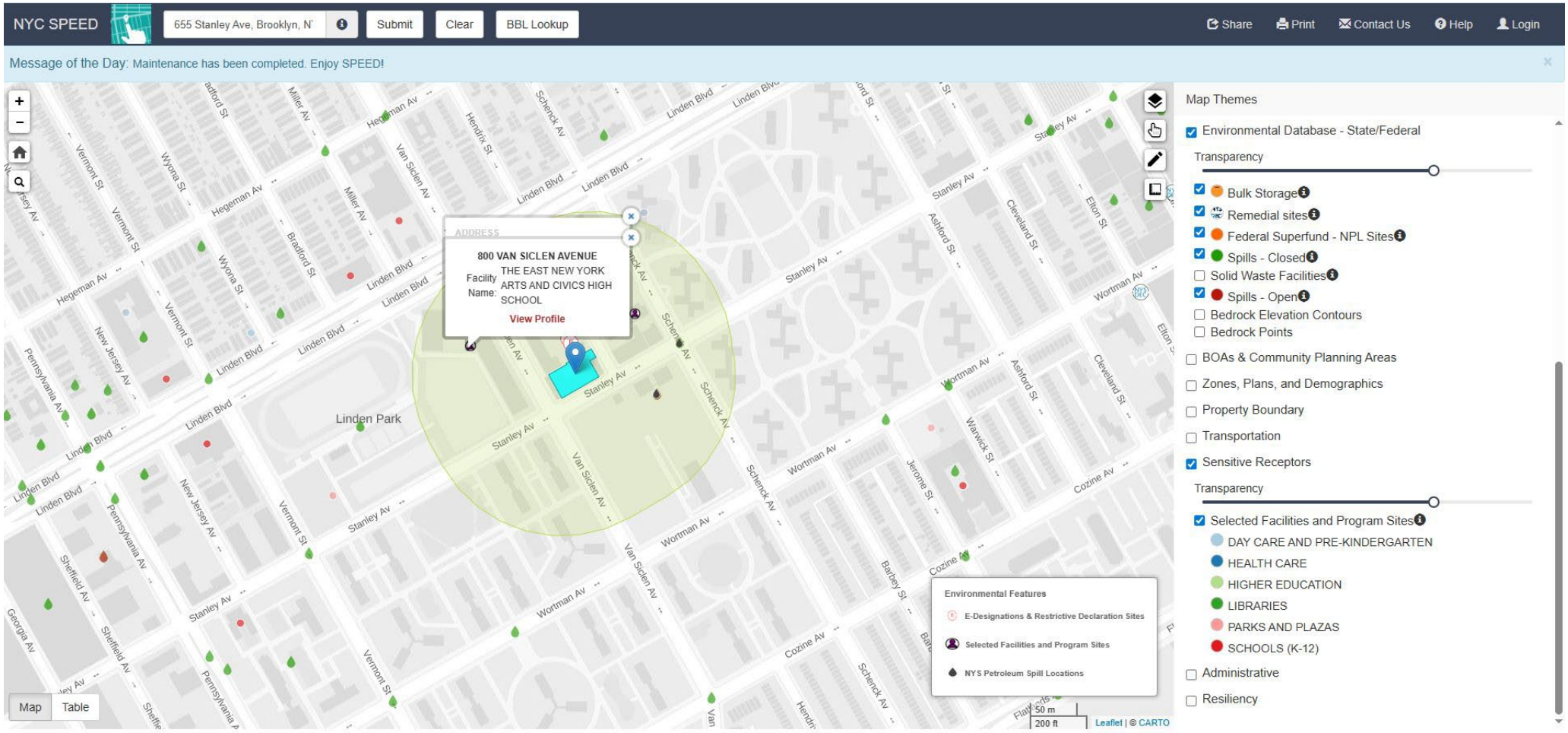
FOLLOW THE LINK BELOW FOR REPORTS:

655-671 Stanley Ave - Surrounding Properties Environmental Reports

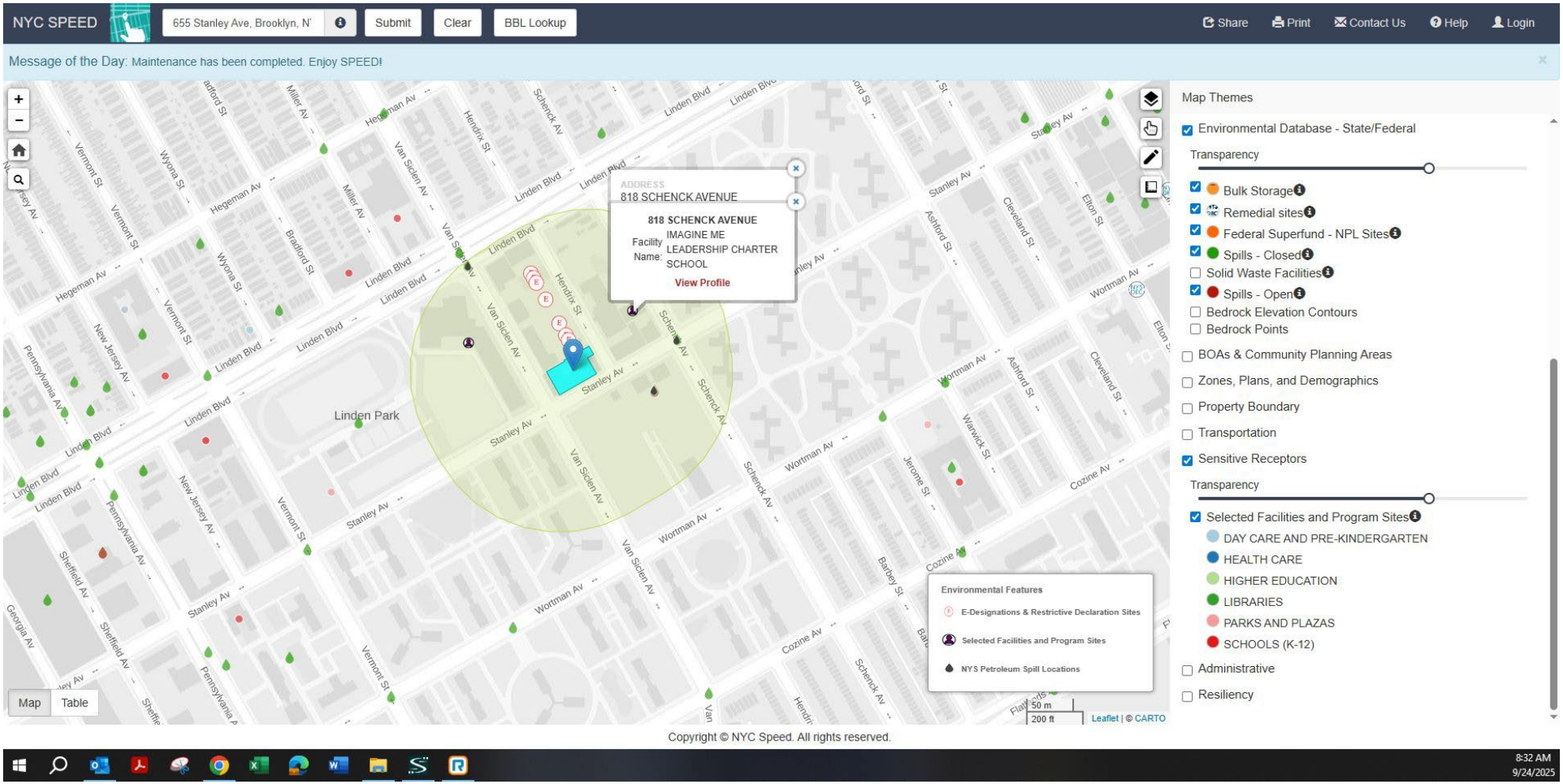
70 West Main Street, Babylon, NY 11702
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APPENDIX K
SENSITIVE RECEPTOR MAPS

70 West Main Street, Babylon, NY 11702
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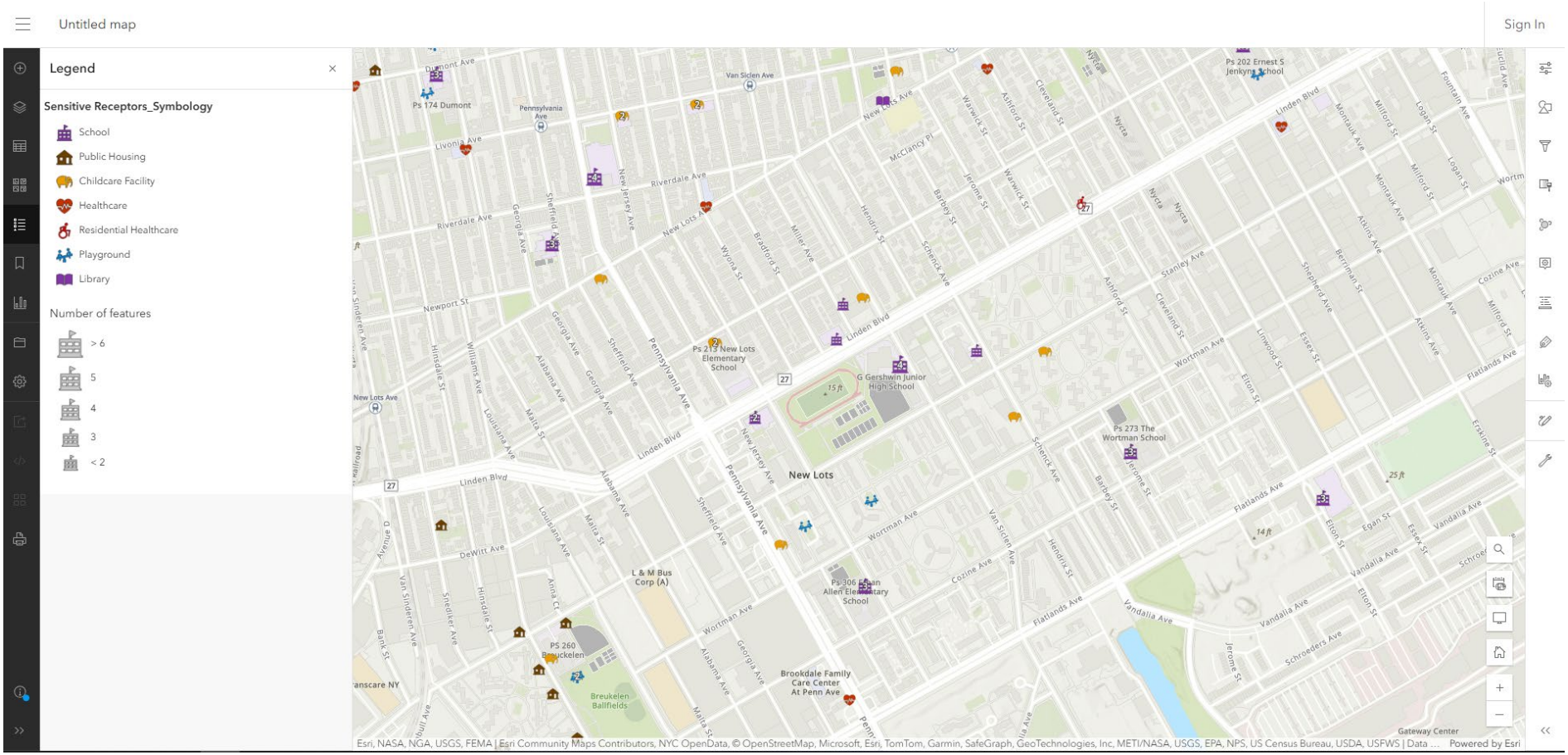


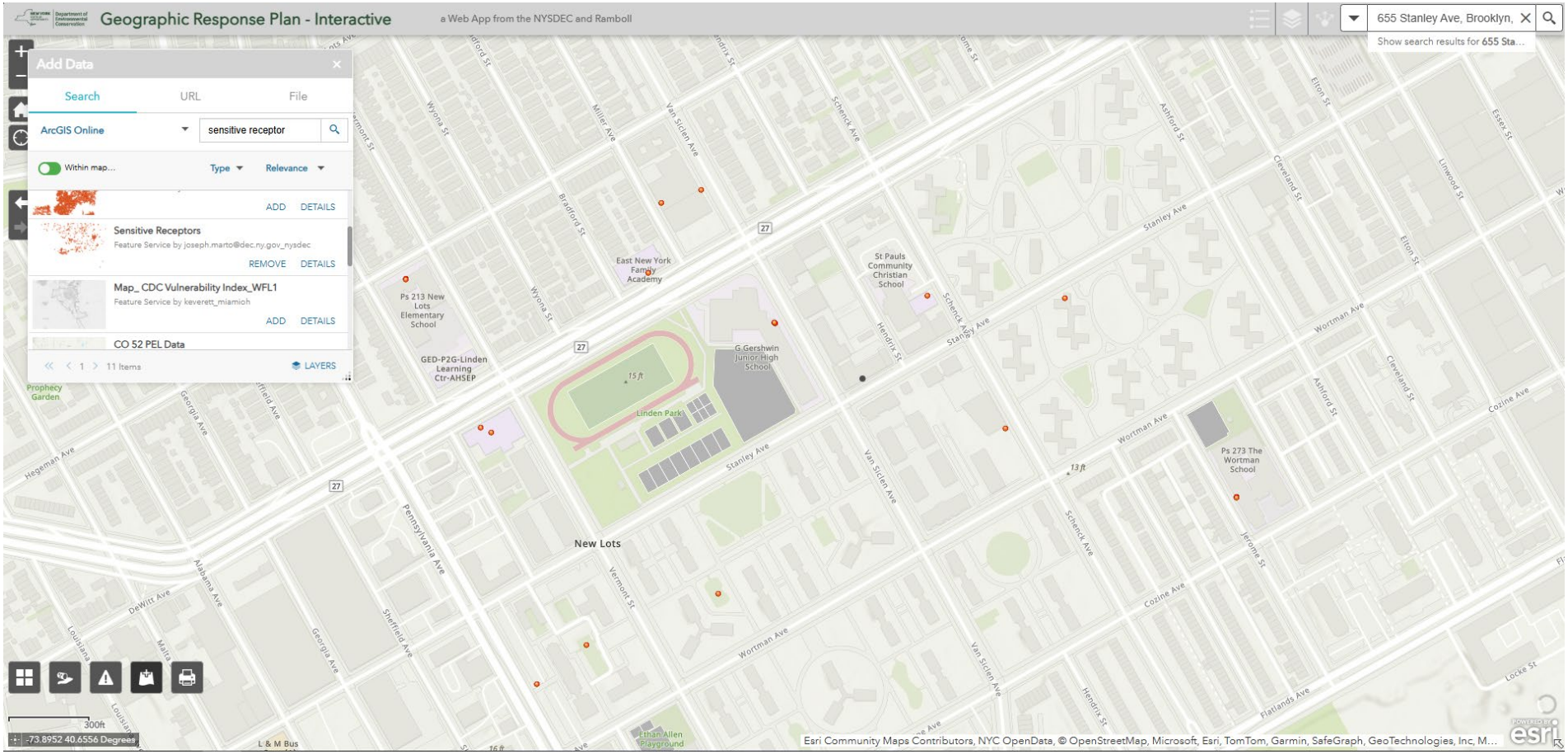
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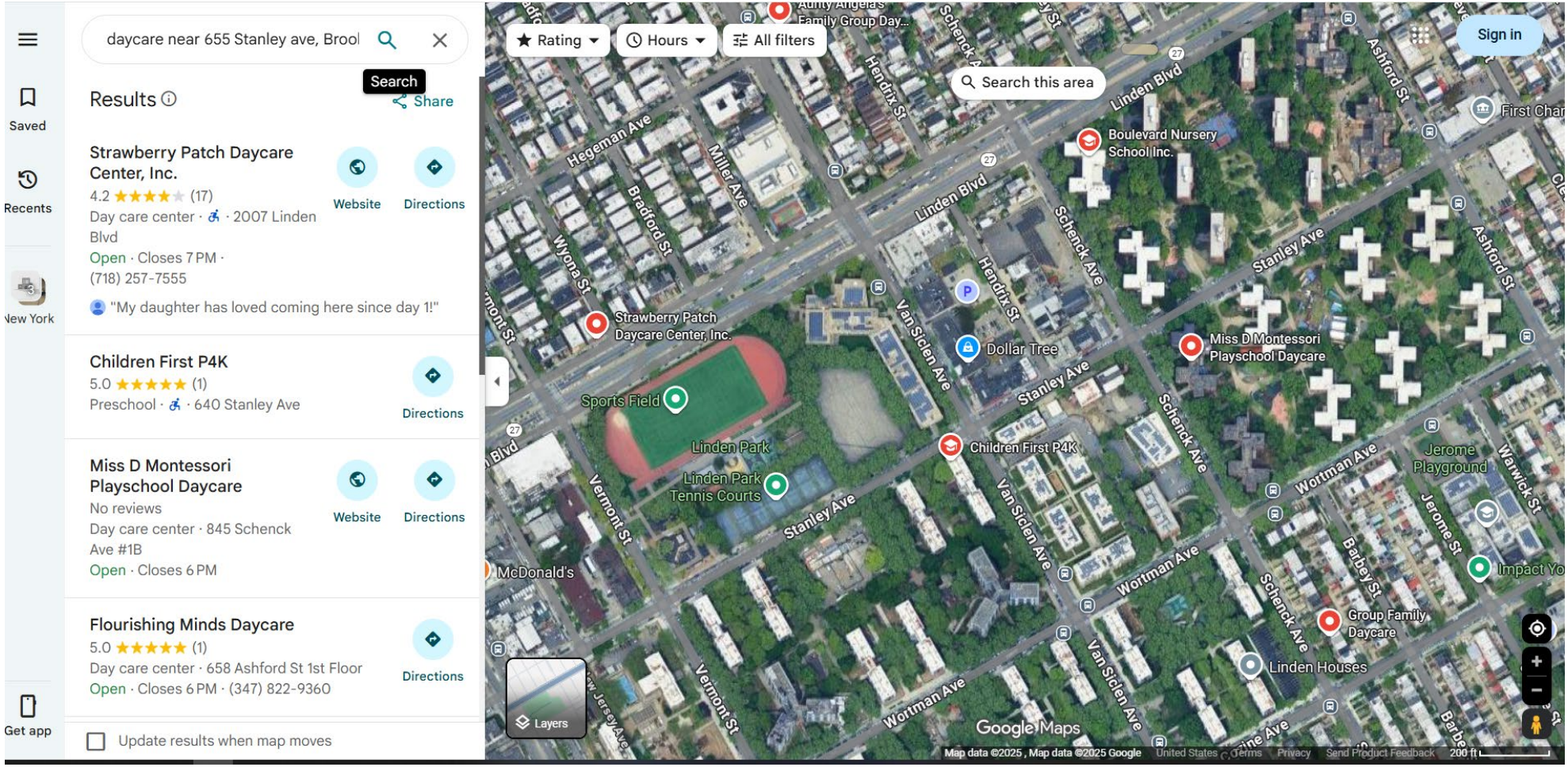
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8:32 AM
9/24/2025


Untitled map
Sign In
Legend
Sensitive Receptors_Symbology
School
Public Housing
Childcare Facility
Healthcare
Residential Healthcare
Playground
Library
Number of features
> 6
5
4
3
< 2
Ps 174 Dumont
Ps 202 Ernest S Jenkyns School
Ps 213 New Lots Elementary School
G Gershwin Junior High School
Ps 273 The Wortman School
Ps 306 Ethan Allen Elementary School
PS 260 Breukelen
Brookdale Family Care Center At Penn Ave
L & M Bus Corp (A)
Breukelen Ballfields
New Lots
Linden Blvd
Pennsylvania Ave
Flatlands Ave
Wortman Ave
Vandalia Ave
Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, NYC OpenData, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS | Data ...
Powered by Esri


Geographic Response Plan - Interactive
a Web App from the NYSDEC and Ramboll
655 Stanley Ave, Brooklyn,
Show search results for 655 Sta...
Add Data
Search
URL
File
ArcGIS Online
sensitive receptor
Within map...
Type
Relevance
ADD
DETAILS
Sensitive Receptors
Feature Service by joseph.marto@dec.ny.gov_nysdec
REMOVE
DETAILS
Map_ CDC Vulnerability Index_WFL1
Feature Service by keverett_miamioh
ADD
DETAILS
CO 52 PEL Data
1
11 Items
LAYERS
Ps 213 New Lots Elementary School
East New York Family Academy
St Pauls Community Christian School
GED-P2G-Linden Learning Ctr-AHSEP
G Gershwin Junior High School
Linden Park
Ps 273 The Wortman School
Prophecy Garden
New Lots
Ethan Allen Playground
Stanley Ave
Wortman Ave
Cozine Ave
Van Siclen Ave
Schenck Ave
Pennsylvania Ave
Vermont St
Sheffield Ave
Georgia Ave
Alabama Ave
DeWitt Ave
Hegeman Ave
Flatlands Ave
Locke St
Jerome St
Ashford St
Cleveland St
Elton St
Linwood St
Essex St
Hendrix St
Bradford St
Miller Ave
Wyona St
15 ft
13 ft
300ft
-73.8952 40.6556 Degrees
L & M Bus
Esri Community Maps Contributors, NYC OpenData, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, M...
esri


schools near 655 Stanley ave, Brook
Saved
Recents
New York
Get app
Results
Share
Achievement First Linden Elementary School
No reviews
Charter school · · 800 Van Siclen Ave
Open · Closes 3:30 PM ·
(347) 471-2700
Website
Directions
East New York Family Academy
No reviews
High school · · 760 Van Siclen Ave
Open · Closes 12:30 AM ·
(718) 927-0012
Website
Directions
The Magnet School of Multimedia Arts and Engineering @ Van Siclen Community Middle
No reviews
Middle school · · 800 Van Siclen Ave
(718) 927-4701
Website
Directions
The East New York Arts and
Update results when map moves
Hours
All filters
Sign in
Search this area
East New York Family Academy
Miller Ave
Bradford St
Linden Blvd
Schenck Ave
Stanley Ave
P.S. 36K school
G Gershwin Junior High School
Hendrix St
Achievement First Linden...
1st Class Physical Therapy, PC
City Fresh Market
Field
Linden Park
Linden Park Tennis Courts
Hendrix Pl
Van Siclen Ave
Redwood Senior Living(Wavecrest...
WATCH high school
Wortman Ave
Barbey St
Layers
Google Maps
Imagery ©2025 Airbus, Maxar Technologies, Map data ©2025 Google United States Terms Privacy Send Product Feedback 200 ft


daycare near 655 Stanley ave, Brool
Search
Results
Share
Saved
Recents
New York
Get app
Strawberry Patch Daycare Center, Inc.
4.2 ★★★★☆ (17)
Day care center · · 2007 Linden Blvd
Open · Closes 7 PM ·
(718) 257-7555
"My daughter has loved coming here since day 1!"
Website
Directions
Children First P4K
5.0 ★★★★★ (1)
Preschool · · 640 Stanley Ave
Directions
Miss D Montessori Playschool Daycare
No reviews
Day care center · 845 Schenck Ave #1B
Open · Closes 6 PM
Website
Directions
Flourishing Minds Daycare
5.0 ★★★★★ (1)
Day care center · 658 Ashford St 1st Floor
Open · Closes 6 PM · (347) 822-9360
Directions
Update results when map moves
Rating
Hours
All filters
Search this area
Sign in
Boulevard Nursery School Inc.
Strawberry Patch Daycare Center, Inc.
Dollar Tree
Miss D Montessori Playschool Daycare
Sports Field
Linden Park
Linden Park Tennis Courts
Children First P4K
Jerome Playground
McDonald's
Group Family Daycare
Linden Houses
Impact Yo
Linden Blvd
Stanley Ave
Wortman Ave
Schenck Ave
Van Siclen Ave
Vermont St
Hendrix St
Ashford St
Hegeman Ave
Miller Ave
Bradford St
Wyona St
Jerome St
Barbey St
Warwick St
Layers
Google Maps
Map data ©2025 , Map data ©2025 Google
United States
Terms
Privacy
Send Product Feedback
200 ft

APPENDIX B
PROJECT STAFF RESUMES

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CASTLETON ENVIRONMENTAL

Frank P. Castellano, PG

10/10/2024 | Principal and Founder



After 23 years leading one of the region's most accomplished and diverse environmental consulting firms, Mr. Castellano founded Castleton Environmental Geologic Services, D.P.C. in 2015 to focus on providing high value environmental consulting services specifically geared to the commercial lending and real estate investment/management industries. Leveraging his many years of experience, Mr. Castellano has earned a reputation for developing strategic approaches to the environmental challenges of complex real estate transactions, redevelopment projects and portfolio management. These approaches enable the transactions to proceed to closing while managing the risks of the involved stakeholders.

Contact Mr. Castellano at frankc@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental Babylon, NY	Founded 2015
PW Grosser Consulting, Inc., Bohemia, NY	1992 – 2015 - Last position held – Sr. Vice President/COO
H2M Group Melville, NY	1989-1992 - Last position held – Field Hydrogeologist

EDUCATION

Adelphi University
Master of Science – Hydrogeology, 1993

State University of New York at Oneonta
Bachelor of Science – Water Resources, 1989

CASTLETON ENVIRONMENTAL

CERTIFICATIONS/QUALIFICATIONS

NYS Professional Geologist, (License No. 000705)
Environmental Professional per 40 CFR 312.10(b)
Licensed Professional Geologist, PA
Licensed Real Estate Sales Professional, NY
OSHA Health & Safety HAZWOPER

AREAS OF EXERTISE

Real Property Transactions & Risk Management
Environmental Program Management
NYC/NYS Brownfields/E-Designations
Real Estate Portfolio Management
Hazardous Waste Investigation and Cleanup

AFFILIATIONS

Long Island Association of Professional Geologists, Member
Long Island Business Development Council, Board Member
Long Island Real Estate Group, Member

NOTABLE ASSIGNMENTS

GTJ REIT Portfolio Management

Mr. Castellano serves as the primary environmental consulting resource to a large Real Estate Investment Trust with holdings in suburban New York, New Jersey, Connecticut and Maryland. Working directly alongside the REIT management team, Mr. Castellano provides environmental due diligence guidance beginning at the contract negotiation phase through closing on new acquisitions. Providing Phase I and II Environmental Site Assessment support, Property Condition Assessments and evaluation of potential liabilities, Mr. Castellano works as part of the team to minimize risk while continuing to help the team add assets to their portfolio. Routine management of the portfolio requires Mr. Castellano's support during tenant lease negotiations, compliance activities and debt re-positioning.

Paramount Assets Portfolio Management

Mr. Castellano serves as a trusted environmental resource to the management team of this real estate company, comprised largely of urban commercial and retail buildings throughout New Jersey. Navigating New Jersey's complex environmental regulatory framework, Mr. Castellano assists this client with pre-acquisition due diligence as well as compliance with the Industrial Site Recovery Act (ISRA).

CASTLETON ENVIRONMENTAL

Phase II Environmental Assessments

For over 30 years, Mr. Castellano has been performing Phase II Environmental Site Assessments for a variety of private real estate clients and lending institutions. For these projects, Mr. Castellano utilizes his knowledge of various field sampling and testing techniques to meet the desired objective of characterizing potential environmental risks. Based on the Phase II findings, Mr. Castellano develops strategies to remedy identified problems and/or manage risks. The ultimate goal for every Phase II is to develop the appropriate strategy to advance the transaction while protecting the interests of those involved. Based on the quality of his work, Mr. Castellano has established many long-standing client relationships due to his ability to deliver clarity to real estate transactions mired in environmental turbidity.

PUBLICATIONS

Case Studies Using USCG Oil Identification System for Petroleum Spill Source Identification (Petroleum Hydrocarbons & Organic Chemicals in Ground Water, Conference, TX, 1993

Intrusive Investigative Techniques for the Identification of DNAPL (Geology of LI/NY; LIAPG 1996)

Surface Water, Sediment & Fishery Survey, Nassau County Ponds (Geology of LI/NY 1997)

Not Just a Chemical Interaction: Complementary Roles of the Geologist & Engineer on Hazardous Waste Remediation Project (Geology of LI/NY 1997)

MTBE in Ground Water Cleanup Technology and Costs (NYIT – Emerging Problems for the New Century 2002)

DOE Brookhaven National Laboratory Transuranic & Legacy Waste Disposal (Waste Management 05 Conference, Tucson, AZ)

Is Your Real Estate Giving You the Vapors? A Look at Soil Vapor Intrusion Regulations and their Impact on Real Estate Transactions (Society of Chief Appraisers NY Conference, Oct 2018)

Jessica Ferngren, P.G.

10/10/2024 | Senior Consultant



As Senior Consultant at Castleton, Jessica Ferngren leverages her more than 20 years of experience in the Environmental Consulting Industry to serve the needs of the firm's clients. Her areas of expertise include Phase I and Phase II Environmental Site Assessments, Remedial Investigations and Remedial Actions under NYSDEC Spills, Hazardous Waste, and Brownfield Programs and NYSDOH, Underground Injection Control Structure Characterization and Remediation under EPA, Nassau County and Suffolk County protocols. Ms. Ferngren has an excellent record in timely completion and maintenance of project coordination, monitoring, and document preparation, while successfully maintaining communication between clients, government agencies, and other parties involved.

Contact Ms. Ferngren at jessicaf@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental, Inc. Babylon, NY	Aug 2015 – Present – Sr. Project Manager
PW Grosser Consulting, Inc. Bohemia, NY	Mar 2014 – Jul 2015 – Sr. Project Manager
Athenica Environmental Services, Inc. Long Island City, NY	Dec 2013 - Mar 2014– Sr. Project Manager
Groundwater & Environmental Services, Inc. Hauppauge, NY	Mar 2012 – Dec 2013–Sr. Project Manager
Gannett Fleming Engineers, PC Locust Valley/Woodbury, NY	Aug 2005- Jun 2011- Project Manager
Shaw E&I, Inc. Holbrook, NY	Sep 2002-Jun 2005-Project Geologist
ERM, Woodbury/Melville, NY	Sep 2000-Sep 2002-Staff Geologist

CASTLETON
ENVIRONMENTAL

EDUCATION

State University of New York at Geneseo
Bachelor of Arts – Geological Sciences, 2000

CERTIFICATION/LICENSES

NYS Professional Geologist License No. 000982
OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-hr & Site Supervisor
RCRA Training
Loss Prevention Systems (LPS), First Aid and CPR
NYCOER Turbo Training

AREAS OF EXERTISE

Environmental Program Management
Hazardous Waste Investigation and Cleanup
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists (Co-President 2014-2015)
American Institute of Professional Geologists – NE Section
New York State Counsel of Professional Geologists

NOTABLE ASSIGNMENTS

Site Assessments and Investigations

Ms. Ferngren has served as a Senior Consultant responsible for hundreds of properties in support of land acquisition or transfer. Support includes Phase I Environmental Site Assessments, Work Plans, Phase II Site Assessment Reports, Investigation Summaries/Remedial Plans, and Remedial Cost Estimates. Responsibilities include cost proposal development, budget and technical tracking, the coordination of soil, groundwater, indoor air, soil vapor, and performing site characterizations. She serves as the liaison with the client, contractors, and state and local officials.

Portfolio Management of Retail Service Station Facilities

Ms. Ferngren has served as Senior Project Manager responsible for the management of over 40 former retail service stations. Her responsibilities in this role included coordination and management of field work including, underground storage tank and fuel system removals, groundwater plume and soil impact delineation, well installation, soil vapor extraction/air sparge system operations and maintenance, and feasibility testing and implementing in situ chemical oxidation. Ms. Ferngren has also led the development of Health and Safety Plans, Site Assessment Work Plans, Interim Remedial Measure and Remedial Action Work Plans and coordinated resulting remedial efforts. Responsible for tracking and maintaining project budgets and relations with the client and the regulators.

John Zator

10/10/2024

Field Manager



John Zator brings almost 8 years of environmental consulting experience to serve the needs of Castleton's clients. His areas of expertise include Phase II Environmental Site Assessments, Remedial Investigations, Remedial Systems Operations/Maintenance and field testing/sampling. Additionally, Mr. Zator has experience working with the local regulatory agencies, Suffolk County Department of Health Services, Nassau County Department of Health, as well as local town/hamlet/village municipalities. Mr. Zator received his Bachelor of Science degree from the State University of New York, at Potsdam in Geology.

The depth and unique experience of each of the Castleton team members complement one another in a way that provides our clients a level of service that exceeds the simple transaction and provides for a more strategic and partnered approach to move projects through to completion.

Contact Mr. Zator at jzator@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental — Jul 2022 – Present
Field Manager
Babylon, NY

Preferred Environmental Services — Jan 2017 - Jul 2022
Geologist I/Lead System Operator
North Merrick, NY

EDUCATION

State University of New York at Potsdam
Bachelor of Science – Geology, 2016

CERTIFICATION/LICENSES

OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-Hr
OSHA 10-Hr Construction Health & Safety
Confined Space Training
Fall Safety Training
NFPA 70E Electrical Training
First Aid and CPR

AREAS OF EXERTISE

Phase II Environmental Due Diligence
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists

NOTABLE ASSIGNMENTS

Lead Operator of Remediation System at State Superfund Site

Mr. Zator served as the Lead Operator of the Operable Unit 1 (OU1) Sub-Slab Depressurization System (SSDS) at the former Unisys Site in Lake Success, New York. Duties included system monitoring, maintenance, provide status updates to operations team and client (Lockheed Martin), performance/compliance testing and sampling, manage field activities/site operations for any on-site work. Responsibilities also included preparation of reports, system alarm testing, and oversight for sub-contractor work.

Site Assessments and Investigations

Mr. Zator has served as a Field Manager for numerous Phase II Environmental Site Assessments, Remedial Investigations, and Remediation projects.

Stephanie O. Davis, P.G., C.P.G.



Ms. Davis has diversified experience in geology and hydrogeology. Her professional experience includes groundwater and soil investigations, design and management of soil remediation projects, design and installation of groundwater containment and remediation systems, groundwater flow modeling, aquifer testing and interpretation, evaluation of site compliance with environmental regulations, environmental permitting, and personnel training.

Functional Role	Title	Years of Experience
Senior Hydrogeologist	Department Manager - Hydrogeology	30+

Personal Data

Education

M.S./1984/Geology/University of Southern California
B.S./1981/Geology/Bucknell University

Registration and Certifications

Certified Professional Geologist #9487, (AIPG) 1995
California Registered Geologist #5192, 1991
Pennsylvania Registered Geologist #PG-000529-G, 1994
OSHA – Approved 40 hour Health and Safety Training Course (1990)
OSHA - Approved 8 hour Health and Safety Training Refresher Courses (1991-Present)
OSHA-Approved 8-hour Site Safety Supervisor Training Course (2008)
National Ground Water Association
Long Island Association of Professional Geologists

Employment History

1993-Present	FPM Group
1992-1993	Chevron Research and Technology Co.
1990-1992	Chevron Manufacturing Co.
1984-1990	Chevron Exploration, Land, and Production Company

Continuing Education

- Treatment of Contaminated Soil and Rock
- Groundwater Pollution and Hydrology
- Environmental Law and Regulation
- Remedial Engineering
- Soil and Foundation Engineering
- Environmental Geochemistry

Detailed Experience

Environmental Data Analysis

- Received multiple sessions of environmental geochemistry training provided by environmental geochemists, including physical chemistry, thermodynamics, ionic interactions, complexation, biologic effects, and other basic principles. Training also included field sampling procedures and effects on chemical data, chemical analytical methods and equipment, and QA/QC procedures and interpretation.
- Reviewed and evaluated numerous soil, groundwater, product, indoor/ambient air and soil vapor chemical analytical datasets, including evaluation of batch and site-specific QA/QC samples, laboratory narratives, comparison to regulatory agency criteria, historic data, and background data.
- Developed and implemented numerous Quality Assurance Project Plans (QAPP), including QAPP design, sample delivery group (SDG) evaluations, sampling procedures and sequences, and QA/QC sample preparation/collection.
- Attended periodic environmental chemistry training sessions hosted by environmental laboratories and participated in hands-on training in data and QA/QC evaluation.
- Prepared Data Usability Summary Reports (DUSRs) for numerous chemical analytical datasets for projects overseen by the USEPA, NYSDEC and other regulatory agencies. Datasets evaluated have included soil, groundwater, soil vapor, indoor air, and ambient air.
- Performed forensic assessments of historic environmental chemical analytical data to resolve apparent discrepancies with modern data and other dataset inconsistencies.
- Assessed various leachate test protocols and results to determine the most applicable methods to evaluate and develop soil cleanup objectives for non-regulated compounds.
- Interpreted numerous organic parameter datasets to evaluate breakdown sequences, likely original parameters, and rates of degradation.
- Formulated numerous chemical treatment plans for insitu remediation of environment contaminants, including assessment of contaminant concentrations and distribution, chemical processes and indicators, natural attenuation indicators, additional stociometric demands, and hydrogeologic factors.

Site Investigations

- Provides oversight and coordination for ongoing investigation and remedial projects at several New York State Inactive Hazardous Waste Disposal Sites, Voluntary Cleanup Program Sites, and

Brownfield Cleanup Program Sites. Investigations have included site characterization, Remedial Investigation/ Feasibility studies, and RCRA Facility Investigations. Remedial Services have included contaminated soil removals; ORC and ARC injections; design, installation and operation of all sparge/soil vapor extraction systems; sub-slab depress investigation, capping, and other remedial services.

- Provides program coordination and oversight for all Phase I ESA, Phase II investigations, and remediation projects for a major commercial developer on Long Island, New York. Projects have included environmental services associated for the purchase and redevelopment of office buildings, aerospace facilities, former research and development facilities, and large manufacturing plants. Remedial Services have provided RCRA closures, UIC closures, tank removals, and Brownfield Cleanup Program projects.
- Planned and managed a Resource Conservation and Recovery Act (RCRA) Facilities Investigation (RFI) at Barksdale AFB, Louisiana for AFCEE. Responsible for all aspects of field program planning, solicitation and selection of subcontractors, mobilization and establishment of a field office, supervising multiple field crews, installation and sampling of monitoring wells, collection and soil samples, data tracking and management and preparation of an RFI report. The scope of work included characterization of the nature and extent of groundwater and soil contamination at thirteen Solid Waste Management Units (SWMUs), performing a base-wide evaluation of background contaminant concentrations, and developing a long-term groundwater monitoring program for the base.
- Managed field sampling crews for major underground storage tank (UST) investigation at Plattsburgh AFB, NY, for AFCEE. Responsible for field crew training, coordination of sampling crews at separate sites, sample labeling, handling, tracking, and shipping, field data management and remote field office management. The scope of work included collection of over 450 groundwater samples to characterize groundwater conditions in the vicinity of 150 USTs using a Geoprobe sampling rig, wellpoints, and rapid turnaround-time analysis.
- Managed site investigation activities, including soil vapor sampling, soil sampling and analysis, groundwater sampling and analysis, and geotechnical evaluation for numerous sites in Suffolk County, New York. The resulting data were utilized by a major supermarket company in the negotiations for the purchase of the properties and in the property remediation prior to development.
- Performed site investigation activities including soil vapor analysis, soil sample analysis, and groundwater sampling and analysis at an active commercial bus terminal in the Bronx, NY. Made recommendations for site remediation including UST removal, soil excavation and disposal, and free-phase product extraction.
- Prepared various work plans and reports, including a RCRA Facilities Investigation Work plan, incorporating existing geologic, chemical and historical data, evaluating newly-acquired site data, and developing recommendations for further investigation and remedial action at a City of Richmond former municipal landfill
- Managed on-site and off-site soil and ground-water sampling program at a manufacturing facility in Bay Shore, NY. Compiled resulting data and prepared a comprehensive report of the investigation results for the Suffolk County Department of Health Services (SCDHS) and NYS Department of Environmental Conservation (NYSDEC). Proposed remediation technologies for on-site soil contamination and on-site and off-site groundwater contamination.
- Managed and conducted a soil and groundwater sampling program using a Geoprobe sampler adjacent to Newark Airport Runway 29 for the Federal Aviation Administration. Analyzed resulting chemical analytical data and presented results to client.
- Supervised and conducted drilling, soil sampling, cone penetrometer testing, and well installation at a refinery process water effluent treatment system and former municipal landfill.
- Supervised drilling, installation, development, and sampling of monitoring wells at numerous sites in the greater New York metropolitan area. Utilized resulting stratigraphic, hydrologic, and chemical analytical data to evaluate site conditions.

Remediation

- Project Manager for all investigation and remedial activities at a NYSDEC Brownfield Cleanup Program site in New York City. Prepared the Remedial Investigation and Remedial Work Plan; coordinated with the owner, other contractors, and the NYSDEC; prepared for and conducted citizen participation activities; supervised all waste characterization, profile preparation, and waste management; developed the Final Engineering Report (FER) and Site Management Plan (SMP) for NYSDEC approval; and ensured that all remedial requirements were met such that the Certificate of Completion (COC) was issued. Continuing activities include coordination of the ongoing site management activities, communications with the NYSDEC and NYSDOH, and preparation of the annual Certification Report.
- Developed pilot test plans, evaluated pilot test results, and prepared conceptual designs for several air sparge/soil vapor extraction (AS/SVE) systems to treat petroleum and/or chlorinated

solvent VOCs. These systems were subsequently installed and Ms. Davis provides ongoing review of system operations and remedial monitoring results.

- In responsible charge of several task orders for waste characterization of a 90,000-cy construction soil stockpile at a municipal sewer facility. Responsibilities included development and implementation of Sampling and Analysis Plans (SAP), coordination of staffing, review of lab data, preparation of Field Sampling Summary Reports (FSSR), coordination with disposal facilities, and preparation of waste profiles.
- Designed soil remediation plan and managed contractor support for a metal parts plating and manufacturing facility in Suffolk County, New York. Soil remediation was overseen and approved by the SCDHS.
- Designed and performed indoor underground storage tank abandonment program, leaching pool remediation plan, and managed contractor support for a tape measure manufacturing facility in Suffolk County, New York. SCDHS provided oversight and approval.
- Participated in the design process for a groundwater containment and remediation system for a former municipal landfill, including subsurface groundwater barrier walls and extraction wells.
- Designed soil remediation plan and supervised contractor performance of soil remediation activities at an active construction site in Carle Place, NY. Project involved excavation and disposal of approximately 5,000 tons of PCB-, metal-, and petroleum-contaminated soil. NYSDEC provided oversight and approval of the completed remediation.
- Coordinated technical aspects of subsurface groundwater barrier wall construction, including routing, permitting, design, material selection, and field activities.

Hydrogeologic Evaluations

- Prepared Engineer's Report for Long Island Well Permit for a 230-gpm irrigation supply well. Responsible for evaluation of well interference, salt water upcoming, impacts from contaminants, and other factors affecting the proposed well.
- Performed well design (gravel pack size, screen size, etc.) for numerous groundwater wells on Long Island. Familiar with sieve analyses, well construction and development methods.
- Utilized Visual Modflow groundwater modeling program to evaluate the impact of a contaminant plume on a proposed SCWA wellfield. Model development included evaluation of recharge, aquifer properties, subsurface stratigraphy, boundary conditions, plume source and concentration, and various wellfield locations and pumping rates.
- Participated in a multi-day, multi-well aquifer pumping test for New York City Transit (NYCT) Lennox Avenue site. Responsible for operating and maintaining data logging equipment, coordinating manual water level measurements, and analyzing resulting drawdown data.
- Evaluated subsurface geologic conditions for NYCT Avenue T site utilizing existing boring logs, topographic, and historic map data.
- Supervised drilling, installation and development of groundwater extraction, injection, and monitoring wells at a USEPA Superfund site in Deer Park, New York. Interpreted aquifer and well performance from development data and made recommendations for modification of drilling and development procedures.
- Performed slug tests on monitoring wells at a New York City Transit Authority site, and evaluated hydrologic properties using the HYDROLOGIC ISOAQX computer program.
- Performed aquifer pumping and slug tests and evaluated hydrologic properties using the computer program AQTESOLV.
- Performed water level and water quality monitoring at an industrial site in Mattituck, NY. Constructed groundwater elevation contour maps and utilized chemical analytical data to predict contaminant plume migration.

Landfills

- Prepared work plans for Closure Investigations of two Town of East Hampton landfills. Each work plan included a Hydrogeologic investigation, methane investigation, surface leachate investigation, and vector investigation. Prepared final Closure Investigation Reports, which were accepted by the NYSDEC.
- Supervised the installation of groundwater and methane monitoring wells to complete the monitoring networks at the Town of East Hampton landfills. Services provided included hollow-stern auger and mud-rotary well installations, split-spoon soil sampling and boring log preparation, oversight and interpretation of wireline electric logging, and completion of initial baseline monitoring events.
- Supervises ongoing groundwater and methane monitoring programs for Town of East Hampton landfills. Responsibilities include field team coordination, communications with the Town, report scheduling, data package review, and report review prior to distribution to the client and NYSDEC.
- Performed groundwater sampling at a radio tower facility constructed on a landfill in NJ. Analyzed results and made recommendations to client.
- Conducted methane monitoring at Springs-Fireplace Road and Montauk Landfills for the Town of East Hampton.

- Used the PC-based modeling program FLOW PATH to predict groundwater flow directions and evaluate extraction well locations and pumping rates for a groundwater containment and remediation system at a former municipal landfill.
- Negotiated successfully with NYSDEC for reduced monitoring frequencies at Town of East Hampton based on historic monitoring results. Maintained quarterly monitoring frequency only for specific containments at key locations.
- Manages monthly methane monitoring for all Town of Islip landfills. Monitoring program includes onsite and offsite methane wells, methane collection systems, and flare systems. Data is recorded electronically and downloaded to computer for formatting prior to delivery to Town. Data is reported in final form within two days of collection.
- Supervises and reviews production of quarterly and annual monitoring reports for all monitoring programs at Town of Smithtown landfill. Project includes tabulation and reporting of groundwater and methane monitoring data, solid waste and recycling collection data, yard waste composting operations, and landfill leachate collection and disposal data. Multiple copies of each report are prepared for Town delivery to the NYSDEC.

Community Impacts

- Developed Community Monitoring Plans (CMP) for several hazardous waste sites. These plans included monitoring procedures, action levels, and mitigation measures for odors, traffic, noise, dust and/or vapors with the potential to affect surrounding communities during investigation and/or remediation. Each CMP was reviewed and approved by the NYSDEC and NYSDOH and was implemented under the oversight of these agencies.
- Developed and implemented an odor abatement plan for highly-odorous soil discovered during a remediation project in New York City. The remediation site was surrounded by three public schools and complaints of nuisance odors were received following discovery of the odorous soil, resulting in a job shutdown until the nuisance was abated. The odor abatement plan was prepared and implemented within 24 hours and involved immediate covering of the odorous soil followed by spot excavation and removal during non-school hours (night work) and the use of odor-controlling foam. The removal was completed within one week without further incident and the NYSDEC and NYSDOH approved the completed work, allowing the job to recommence.
- Attended and presented at numerous community meetings for various environmental sites to explain the purpose of CMPs, the types of observations and their interpretation, and mitigation measures. Addressed community and agency questions and issues.
- Evaluated and implemented abatement for vectors (rodents, flies, and seagulls) at several Long Island landfills in association with landfill closure. These activities included inspection and reporting of vector populations, development of vector abatement plans, and assisting Town personnel with vector abatement.
- Conducted inspections of intense fly infestations at a Town transfer station building. The inspections were used to identify the locations and migration pathways of flies inside the building and to develop an abatement plan. This plan was successfully implemented by Town personnel to abate the nuisance fly infestations.
- Developed and implemented air and soil vapor investigations of residential and commercial properties to evaluate potential air quality impacts. These investigations were conducted using plans approved by the NYSDEC and NYSDOH. The resulting data were used to evaluate whether air quality impacts were present and whether mitigation or monitoring were necessary. These evaluations were submitted for NYSDEC and NYSDOH review and approval, together with appropriate monitoring/mitigation designs.
- Conducted odor, dust, noise and organic vapor monitoring at several community areas surrounding environmental sites. Data were collected and interpreted in accordance with NYSDEC and/or NYSDOH guidance and the results were submitted to these agencies together with recommendations for mitigation, if appropriate.

Expert Witness/Technical Services

- Provided expert witness and technical services regarding environmental conditions and remedial procedures for a proposed residential redevelopment of a former oil terminal. Services included preparing and obtaining NYSDEC and NCDOH approval of remedial work plans for three environmental areas of concern, preparing remedial cost estimates and schedules, and providing testimony at a public hearing before the North Hempstead Town Board from which a change of zone was requested. The proposed change of zone, although subject to considerable public opposition, was approved, allowing redevelopment and associated remediation of the property to move forward.
- Provided expert witness and technical services to the legal team defending a petroleum company against NYSDEC cost recovery claims at a petroleum spill site. The spill site was complex, involving two very large petroleum releases at gasoline stations adjoining the defendant's property. Services provided included evaluating petroleum tank tests, groundwater, soil and soil vapor chemical analytical data, petroleum

fingerprint data, remediation activities and costs. Products prepared include numerous detailed timelines of various activities, large displays showing site information and subsurface conditions, and cost allocation calculations. A detailed subsurface investigation was also performed to evaluate stratigraphic conditions.

- Assisted the Village of Larchmont legal team in successfully opposing the construction of an IKEA superstore in the adjoining community of New Rochelle. Work performed included evaluating the previous environmental investigations of the proposed store site, developing cost estimates and scopes of work for a full environmental evaluation of the site, preparing scoping cost estimates for likely remediation scenarios, preparing technical documents in support of the Village of Larchmont's position and making a presentation at a large public hearing for the project. The proposed project was subsequently withdrawn.
- Provided technical evaluation of a proposed water district in the Town of Carmel in support of legal efforts to oppose the district. The proposed water district was opposed by existing residents due to limited available water supplies and likely impact on their existing wells. The scope of work included evaluation of aquifer pumping tests, determining impacts on nearby wells, assessment of likely increased water demand, preparation of several supporting documents, and presentations (including providing testimony to a judge) at project hearings. The proposed project was subsequently conditionally approved by the NYSDEC with significant modifications to protect the water rights of existing residents.

- Provided technical support to the Croton Watershed Clean Water Coalition (CWCWC) in assessing the impacts of several proposed road construction projects on the Kensico Reservoir and other nearby water bodies of the New York City water supply system. This work included evaluating stormwater pollutant loading calculations, assessing impacts to wetlands, promoting application of more accurate stormwater runoff calculation methods, assessing proposed stormwater management techniques, attending and making presentations at public meetings, preparing technical statements for submittal to regulatory agencies, and participating in the NYSDOT's Stormwater Pollution Prevention Plan (SPPP) Guidance committee.
- Prepared several affidavits regarding environmental conditions at client properties in support of pending legal actions. Issues evaluated included landfill issues, wetlands and navigable waterway issues, and petroleum spill issues.

Health and Safety

- Performed health and safety monitoring at investigation and remediation sites during intrusive activities. Monitoring included calibration and operation of photoionization detector (PID) and flame-ionization detector (FID) for organic vapors and combustible gas indicator (CGI) for methane. Compared results to applicable action levels and took preventative/protective measures as necessary.
- Performed community monitoring, including monitoring for noise, particulates (dust), and organic vapors. Recorded observations and compared to applicable action levels. Familiar with calibration and operation of noise meters, particulate monitors, and PID/FID.
- Performed screening for radiation at select sites. Familiar with operation of Geiger counter in different radiation modes and with background readings.

Miscellaneous Projects

- Performed numerous Phase I Site Assessments for residential and industrial sites on Long Island, New York.
- Conducted aquifer pumping and soil vapor extraction test training. Instructed classes for site investigation methods, aquifer pumping test analysis, and risk assessment.
- Performed various project management functions, including development and management of project
- Processed and interpreted seismic reflection data and constructed seismic velocity models.
- Evaluated site compliance with environmental regulations. Assisted and reviewed regulator's revision of proposed risk assessment-based UST cleanup guidelines. Reviewed proposed USEPA NPDES permits for remediation system effluent.
- Constructed and interpreted structural and stratigraphic cross sections, and structure contour, fault surface, isochore, and isopach maps.

APPENDIX C
QUALITY ASSURANCE PROJECT PLAN

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CASTLETON ENVIRONMENTAL

QUALITY ASSURANCE PROJECT PLAN
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
OCTOBER 2025
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2501

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1- Proposed Sampling Locations

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Appendices

A - Personnel Resumes

1.0 INTRODUCTION

Castleton Environmental Geologic Services, DPC (Castleton), has prepared this Quality Assurance Project Plan (QAPP) for the property located 655-671 Stanley Avenue Brooklyn, New York to support the SC activities for this site.

This QAPP provides a general overview of the measure to be employed during the investigation activities at the site.

2.0 PROJECT SCOPE

The objective of the site characterization (SC) includes assessing areas of concern including groundwater quality and the potential for a soil vapor intrusion (SVI) condition at the site.

The proposed scope of work for the SC includes:

- A geophysical survey to determine sewer and drainage pathways and to clear locations of underground obstructions prior to intrusive activities commencing;
- Groundwater sampling to assess post remedial effects on groundwater quality;
- A soil vapor investigation to assess appropriate vapor mitigation measures.

Castleton will conduct the SC on behalf of the site owner Unidos ZR LLC. All SC work will be overseen by a Qualified Environmental Professional (QEP) and/or a NYS Professional Geologist (PG).

The scope of this QAPP is to provide Quality Assurance/Quality Control (QA/QC) procedures during the proposed SC Work Plan. The intent of the SC Work Plan is to characterize the nature and extent of site contamination identified in previous investigations, including:

- Installation of permanent soil vapor points and temporary sub-slab vapor points
- Groundwater sampling of drywells and monitoring wells
- Soil vapor sampling

The purpose and scope of this QAPP is to provide guidance and procedures intended to ensure data derived during the SC activities are of sufficient quality to be relied upon for its intended use. The goals of this QAPP include ensuring QA/QC measures are met and include:

- Accuracy
- Precision
- Sensitivity
- Representation
- Completeness
- Comparability (Where applicable)

Site plans depicting the proposed sampling areas are provided as Figure 1.

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3.0 PROJECT TEAM

The QAPP shall be implemented by several organizations and personnel under contract as listed below:

- Project Manager – Castleton – Jessica Ferngren, PG (Sr. Consultant)
- Quality Assurance Officer (QAO) – Castleton – Frank Castellano, PG (Principal)
- Field Staff – Castleton – John Zator (Staff Scientist)
- Data Validator – Stephanie Davis, CPG, PG

Personnel resumes are included as Appendix A.

3.1 Environmental Laboratory Accreditation Program

An ELAP-certified laboratory will be used for all sample analyses. The laboratory will follow the following QA/QC protocols. All samples will be delivered to the laboratory within 24 hours of sample collection. Samples will be received by laboratory personnel, who will inspect the sample cooler(s) to check the integrity of the custody seals. The cooler(s) will then be opened, the samples unpackaged, and the information on the chain-of-custody form examined. If the shipped samples match those described on the chain-of-custody form, the laboratory sample custodian will sign and date the form on the next "Received" blank and assume responsibility for the samples. If problems are noted with the sample shipment, the laboratory custodian will sign the form and record problems in the "Remarks" box. The custodian will then immediately notify the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

A record of the information detailing the handling of a particular sample through each stage of analysis will be maintained by the laboratory. The record will include:

- Job reference, sample matrix, sample number, and date sampled;
- Date and time received by laboratory, holding conditions, and analytical parameters;
- Extraction date, time and extractor's initials (if applicable), analysis date, time, and analyst's initials; and
- QA batch number, date reviewed, and reviewer's initials.

The selected ELAP approved lab for this project is Pace Analytical Services.

4.0 DATA QUALITY USABILITY OBJECTIVES

The overall data quality objectives of this QAPP is to collect and derive data that is of reliable and documented quality for its intended purpose. Specific to the proposed SC, the specific objectives include collected representative vapor and groundwater samples of sufficient frequency and distribution to characterize. By implementing appropriate QA/QC procedures for the sample collection, laboratory analysis, and validation will help ensure the analytical results are accurate

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and of documented quality which can be relied upon for decision making for future investigation and remediation activities.

4.1 Standards, Criteria, and Guidance

The following standards, criteria, and guidance (SCGs) have been identified for the site:

- NYSDEC DER-10;
- The NYSDEC Class GA Ambient Water Quality Standards and Guidance Values, which are used to evaluate the groundwater chemical analytical results;
- New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006)* and subsequent updates
- The 6 NYCRR Parts 370, 371, and 372 regulations for hazardous waste management, which are used to guide hazardous waste characterization and disposal

5.0 SAMPLING AND DECONTAMINATION PROCEDURES

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, daily;
- Use of dedicated and/or disposable field sampling equipment;
- Proper decontamination when non-disposable field equipment is utilized;
- Proper sample handling and preservation;
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- Disposable sampling equipment, including acetate sleeves, nitrile gloves, and disposable bailers (or sample tubing), will be used to minimize cross-contamination between samples;
- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary;

Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

QA/QC procedures will be used to provide performance information regarding field procedures to:

- document that samples are representative of actual conditions at the site and
- identify possible cross-contamination from field activities or sample transit.

Specific laboratory QA/QC procedures and analyses will be used to:

- demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or

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- by laboratory techniques that may have introduced systematic or random errors to the analytical process.

5.1 QA/QC Samples

QA/QC samples will be collected and utilized to evaluate the potential for field or laboratory contamination and to evaluate the laboratory's analytical precision and accuracy. The specific types of QA/QC samples to be collected are described below.

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples.
- The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples.
- Request appropriate data deliverable (Category B) and an electronic data deliverable

5.2 Sampling and Investigation Procedures

The SC is a multi-media investigation which includes sampling of vapor and groundwater. A variety of sampling techniques may be utilized including:

- Hollow Stem Auger/Direct Push Drilling
- Vapor Screening
- Soil Vapor Implant and Sampling
- Groundwater Monitoring Well and Drywell Groundwater Sampling

5.3 Decontamination Procedures

In general, all non-disposable downhole equipment used during sampling activities will be decontaminated by washing in a potable water and Alconox solution and rinsing in potable water prior to use at each location to reduce the potential for cross contamination. All sampling equipment will be either dedicated disposable equipment or will be decontaminated prior to use at each location. The decontamination procedures utilized for all non-disposable sampling equipment will be as follows:

- The equipment will be scrubbed in a bath of potable water and low-phosphate detergent (Alconox or Liquinox) followed by a potable water rinse;
- The equipment will be rinsed with distilled water; and
- The equipment will be allowed to air dry, if feasible.

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5.4 Chain of Custody Procedures

After each sample is collected and appropriately identified, the following information will be recorded on the chain-of-custody form:

- sample identification;
- date and time of sample collection;
- sampling depth;
- identity of samplers;
- sampling methods and devices;
- soil vapor purge volumes;
- volume of soil vapor extracted;
- if canisters used, vacuum of canisters before and after samples collected,
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone; and
- chain of custody protocols and records used to track samples from sampling point to analysis.

The sampler will sign and date the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form in a Ziploc plastic bag. The canisters will be picked up by a laboratory representative from the site or hand delivered to the laboratory.

5.5 Field Logs and Reports

Field logs and borings logs will be completed throughout the course of this investigation. A field log will be completed daily which will describe all field activities including:

- Project number, name, manager, and address;
- The date and time;
- The weather conditions;
- On-site personnel and associated affiliations;
- Description of field activities; and
- Pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

6.0 ANALYTICAL METHODS/QUALITY ASSURANCE

To assess the adequacy of the samples collected and decontamination procedures performed in the field, QA/QC samples shall be collected and analyzed throughout the field sampling program. In general, QA/QC samples shall confirm that the procedures performed in the field are consistent and acceptable. QA/QC samples must include trip blanks, field (or equipment) blanks, blind (or field) duplicates, matrix spike (MS), and matrix spike duplicate (MSD).

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The anticipated sample matrices collected for the purpose of this QAPP include vapor and groundwater samples. The types and frequencies of field QA/QC samples are provided in the table below:

QA/QC Samples	Frequency
Field/Equipment Blanks	1 per day / matrix
Trip Blanks	1 per cooler
Analytical Parameters	In accordance with 6 NYCRR Part 375
Minimum reporting Limits	In accordance with 6 NYCRR Part 375
MS/MSD Samples to be Collected	1 each per 20 samples/matrix
Duplicate and Blind Duplicate Samples	1 each per 20 samples/matrix

The Analytical Methods/Quality Assurance Summary Table is included as Table 1.

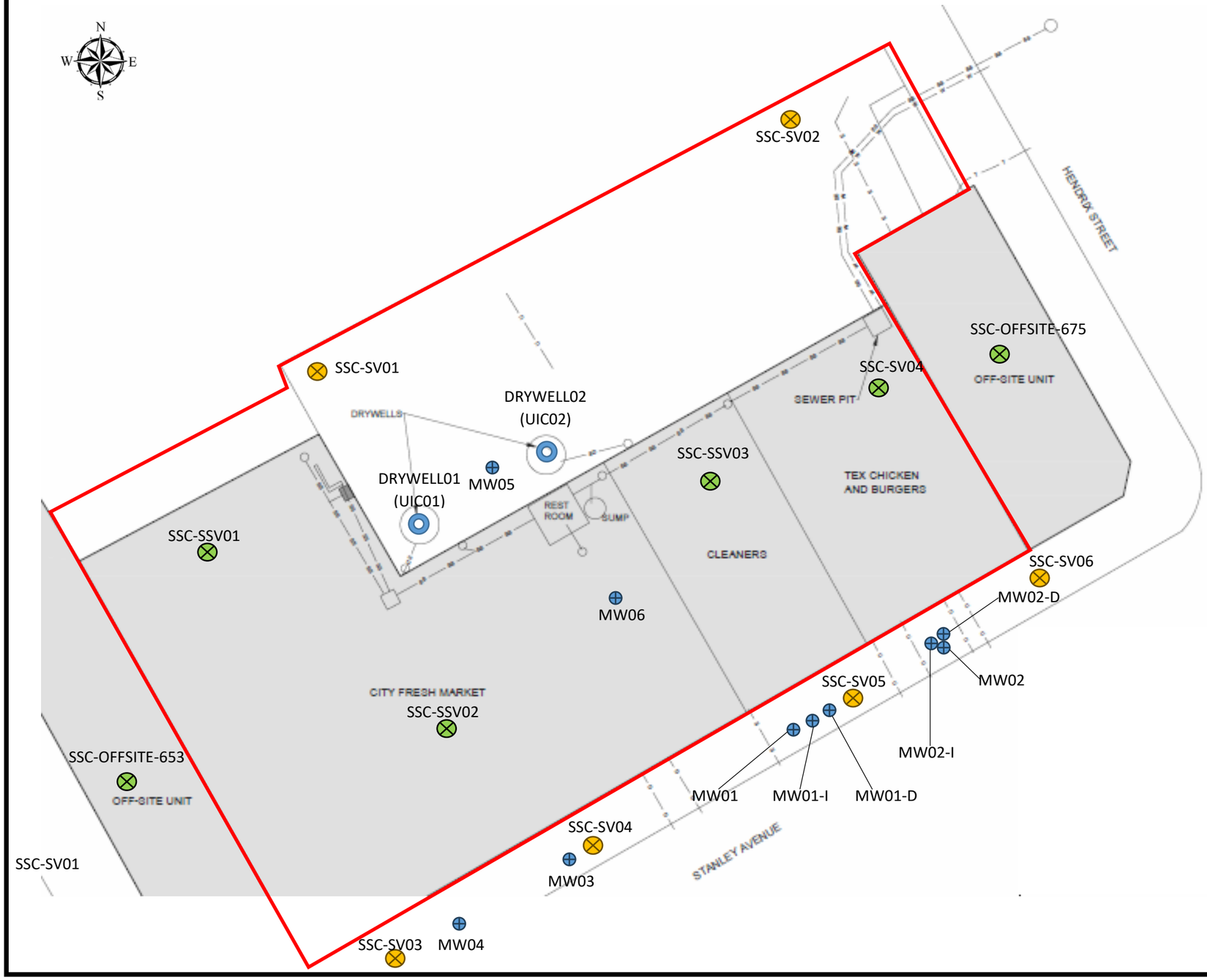
7.0 DATA USABILITY SUMMARY REPORT

A Category B Data Usability Summary Report (DUSR) will be prepared by a third-party contractor (FPM-Stephanie Davis). This will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A data usability summary report (DUSR) will be prepared for each data package following the "Guidance for the Development of Data Usability Summary Reports" provided by the NYSDEC (Appendix 2B of DER-10).

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FIGURES

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LEGEND

- Site Boundary
- Drywells
- Monitoring Well Locations
- Proposed Permanent Soil Vapor Sample Locations
- Proposed Sub-Slab Vapor Sample Locations

NOTE

Base Map Provided by East Coast Geophysics, Inc.
Basement floor area depicted for each tenant space.

0 15 30
(FEET)

Figure 1
PROPOSED SAMPLE LOCATIONS

655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

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TABLES

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TABLE 1
PROJECT PERSONNEL
655-671 STANLEY AVENUE, BROOKLYN, NEW YORK
NYSDEC SITE#224415

Role	Name	Phone Numbers	Email
Project Manager	Jessica Ferngren, PG	Office - 631-482-1818 Cell- 631-416-2660	jessicaf@castletonenv.com
QA/QC Officer	Frank P. Castellano, PG	Office - 631-482-1818 Cell- 631-416-1222	frankc@castletonenv.com
Field Services Manager	John Zator	Office - 631-482-1818 Cell- 631-572-0991	jzator@castletonenv.com
Owner Contact	Barry Cohen, Esq. (counsel for property owner)	Office -516-296-7044	bcohen@certilmanbalin.com
Third Party Data Validator	FPM Group- Stephanie Davis	Office-(631) 737-6200 ext. 528	s.davis@fpm-group.com

APPENDIX A – PERSONNEL RESUMES

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CASTLETON ENVIRONMENTAL

Frank P. Castellano, PG

10/10/2024 | Principal and Founder



After 23 years leading one of the region's most accomplished and diverse environmental consulting firms, Mr. Castellano founded Castleton Environmental Geologic Services, D.P.C. in 2015 to focus on providing high value environmental consulting services specifically geared to the commercial lending and real estate investment/management industries. Leveraging his many years of experience, Mr. Castellano has earned a reputation for developing strategic approaches to the environmental challenges of complex real estate transactions, redevelopment projects and portfolio management. These approaches enable the transactions to proceed to closing while managing the risks of the involved stakeholders.

Contact Mr. Castellano at frankc@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental Babylon, NY	Founded 2015
PW Grosser Consulting, Inc., Bohemia, NY	1992 – 2015 - Last position held – Sr. Vice President/COO
H2M Group Melville, NY	1989-1992 - Last position held – Field Hydrogeologist

EDUCATION

Adelphi University
Master of Science – Hydrogeology, 1993

State University of New York at Oneonta
Bachelor of Science – Water Resources, 1989

CASTLETON ENVIRONMENTAL

CERTIFICATIONS/QUALIFICATIONS

NYS Professional Geologist, (License No. 000705)
Environmental Professional per 40 CFR 312.10(b)
Licensed Professional Geologist, PA
Licensed Real Estate Sales Professional, NY
OSHA Health & Safety HAZWOPER

AREAS OF EXERTISE

Real Property Transactions & Risk Management
Environmental Program Management
NYC/NYS Brownfields/E-Designations
Real Estate Portfolio Management
Hazardous Waste Investigation and Cleanup

AFFILIATIONS

Long Island Association of Professional Geologists, Member
Long Island Business Development Council, Board Member
Long Island Real Estate Group, Member

NOTABLE ASSIGNMENTS

GTJ REIT Portfolio Management

Mr. Castellano serves as the primary environmental consulting resource to a large Real Estate Investment Trust with holdings in suburban New York, New Jersey, Connecticut and Maryland. Working directly alongside the REIT management team, Mr. Castellano provides environmental due diligence guidance beginning at the contract negotiation phase through closing on new acquisitions. Providing Phase I and II Environmental Site Assessment support, Property Condition Assessments and evaluation of potential liabilities, Mr. Castellano works as part of the team to minimize risk while continuing to help the team add assets to their portfolio. Routine management of the portfolio requires Mr. Castellano's support during tenant lease negotiations, compliance activities and debt re-positioning.

Paramount Assets Portfolio Management

Mr. Castellano serves as a trusted environmental resource to the management team of this real estate company, comprised largely of urban commercial and retail buildings throughout New Jersey. Navigating New Jersey's complex environmental regulatory framework, Mr. Castellano assists this client with pre-acquisition due diligence as well as compliance with the Industrial Site Recovery Act (ISRA).

CASTLETON ENVIRONMENTAL

Phase II Environmental Assessments

For over 30 years, Mr. Castellano has been performing Phase II Environmental Site Assessments for a variety of private real estate clients and lending institutions. For these projects, Mr. Castellano utilizes his knowledge of various field sampling and testing techniques to meet the desired objective of characterizing potential environmental risks. Based on the Phase II findings, Mr. Castellano develops strategies to remedy identified problems and/or manage risks. The ultimate goal for every Phase II is to develop the appropriate strategy to advance the transaction while protecting the interests of those involved. Based on the quality of his work, Mr. Castellano has established many long-standing client relationships due to his ability to deliver clarity to real estate transactions mired in environmental turbidity.

PUBLICATIONS

Case Studies Using USCG Oil Identification System for Petroleum Spill Source Identification (Petroleum Hydrocarbons & Organic Chemicals in Ground Water, Conference, TX, 1993

Intrusive Investigative Techniques for the Identification of DNAPL (Geology of LI/NY; LIAPG 1996)

Surface Water, Sediment & Fishery Survey, Nassau County Ponds (Geology of LI/NY 1997)

Not Just a Chemical Interaction: Complementary Roles of the Geologist & Engineer on Hazardous Waste Remediation Project (Geology of LI/NY 1997)

MTBE in Ground Water Cleanup Technology and Costs (NYIT – Emerging Problems for the New Century 2002)

DOE Brookhaven National Laboratory Transuranic & Legacy Waste Disposal (Waste Management 05 Conference, Tucson, AZ)

Is Your Real Estate Giving You the Vapors? A Look at Soil Vapor Intrusion Regulations and their Impact on Real Estate Transactions (Society of Chief Appraisers NY Conference, Oct 2018)

Jessica Ferngren, P.G.

10/10/2024 | Senior Consultant



As Senior Consultant at Castleton, Jessica Ferngren leverages her more than 20 years of experience in the Environmental Consulting Industry to serve the needs of the firm's clients. Her areas of expertise include Phase I and Phase II Environmental Site Assessments, Remedial Investigations and Remedial Actions under NYSDEC Spills, Hazardous Waste, and Brownfield Programs and NYSDOH, Underground Injection Control Structure Characterization and Remediation under EPA, Nassau County and Suffolk County protocols. Ms. Ferngren has an excellent record in timely completion and maintenance of project coordination, monitoring, and document preparation, while successfully maintaining communication between clients, government agencies, and other parties involved.

Contact Ms. Ferngren at jessicaf@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental, Inc. Babylon, NY	Aug 2015 – Present – Sr. Project Manager
PW Grosser Consulting, Inc. Bohemia, NY	Mar 2014 – Jul 2015 – Sr. Project Manager
Athenica Environmental Services, Inc. Long Island City, NY	Dec 2013 - Mar 2014– Sr. Project Manager
Groundwater & Environmental Services, Inc. Hauppauge, NY	Mar 2012 – Dec 2013–Sr. Project Manager
Gannett Fleming Engineers, PC Locust Valley/Woodbury, NY	Aug 2005- Jun 2011- Project Manager
Shaw E&I, Inc. Holbrook, NY	Sep 2002-Jun 2005-Project Geologist
ERM, Woodbury/Melville, NY	Sep 2000-Sep 2002-Staff Geologist

CASTLETON
ENVIRONMENTAL

EDUCATION

State University of New York at Geneseo
Bachelor of Arts – Geological Sciences, 2000

CERTIFICATION/LICENSES

NYS Professional Geologist License No. 000982
OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-hr & Site Supervisor
RCRA Training
Loss Prevention Systems (LPS), First Aid and CPR
NYCOER Turbo Training

AREAS OF EXERTISE

Environmental Program Management
Hazardous Waste Investigation and Cleanup
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists (Co-President 2014-2015)
American Institute of Professional Geologists – NE Section
New York State Counsel of Professional Geologists

NOTABLE ASSIGNMENTS

Site Assessments and Investigations

Ms. Ferngren has served as a Senior Consultant responsible for hundreds of properties in support of land acquisition or transfer. Support includes Phase I Environmental Site Assessments, Work Plans, Phase II Site Assessment Reports, Investigation Summaries/Remedial Plans, and Remedial Cost Estimates. Responsibilities include cost proposal development, budget and technical tracking, the coordination of soil, groundwater, indoor air, soil vapor, and performing site characterizations. She serves as the liaison with the client, contractors, and state and local officials.

Portfolio Management of Retail Service Station Facilities

Ms. Ferngren has served as Senior Project Manager responsible for the management of over 40 former retail service stations. Her responsibilities in this role included coordination and management of field work including, underground storage tank and fuel system removals, groundwater plume and soil impact delineation, well installation, soil vapor extraction/air sparge system operations and maintenance, and feasibility testing and implementing in situ chemical oxidation. Ms. Ferngren has also led the development of Health and Safety Plans, Site Assessment Work Plans, Interim Remedial Measure and Remedial Action Work Plans and coordinated resulting remedial efforts. Responsible for tracking and maintaining project budgets and relations with the client and the regulators.

John Zator

10/10/2024

Field Manager



John Zator brings almost 8 years of environmental consulting experience to serve the needs of Castleton's clients. His areas of expertise include Phase II Environmental Site Assessments, Remedial Investigations, Remedial Systems Operations/Maintenance and field testing/sampling. Additionally, Mr. Zator has experience working with the local regulatory agencies, Suffolk County Department of Health Services, Nassau County Department of Health, as well as local town/hamlet/village municipalities. Mr. Zator received his Bachelor of Science degree from the State University of New York, at Potsdam in Geology.

The depth and unique experience of each of the Castleton team members complement one another in a way that provides our clients a level of service that exceeds the simple transaction and provides for a more strategic and partnered approach to move projects through to completion.

Contact Mr. Zator at jzator@castletonenv.com

PROFESSIONAL EXPERIENCE

Castleton Environmental — Jul 2022 – Present
Field Manager
Babylon, NY

Preferred Environmental Services — Jan 2017 - Jul 2022
Geologist I/Lead System Operator
North Merrick, NY

EDUCATION

State University of New York at Potsdam
Bachelor of Science – Geology, 2016

CERTIFICATION/LICENSES

OSHA HAZWOPER 40-Hr; OSHA HAZWOPER 8-Hr
OSHA 10-Hr Construction Health & Safety
Confined Space Training
Fall Safety Training
NFPA 70E Electrical Training
First Aid and CPR

AREAS OF EXERTISE

Phase II Environmental Due Diligence
Environmental & Regulatory Compliance

AFFILIATIONS

Long Island Association of Professional Geologists

NOTABLE ASSIGNMENTS

Lead Operator of Remediation System at State Superfund Site

Mr. Zator served as the Lead Operator of the Operable Unit 1 (OU1) Sub-Slab Depressurization System (SSDS) at the former Unisys Site in Lake Success, New York. Duties included system monitoring, maintenance, provide status updates to operations team and client (Lockheed Martin), performance/compliance testing and sampling, manage field activities/site operations for any on-site work. Responsibilities also included preparation of reports, system alarm testing, and oversight for sub-contractor work.

Site Assessments and Investigations

Mr. Zator has served as a Field Manager for numerous Phase II Environmental Site Assessments, Remedial Investigations, and Remediation projects.

Stephanie O. Davis, P.G., C.P.G.



Ms. Davis has diversified experience in geology and hydrogeology. Her professional experience includes groundwater and soil investigations, design and management of soil remediation projects, design and installation of groundwater containment and remediation systems, groundwater flow modeling, aquifer testing and interpretation, evaluation of site compliance with environmental regulations, environmental permitting, and personnel training.

Functional Role	Title	Years of Experience
Senior Hydrogeologist	Department Manager - Hydrogeology	30+

Personal Data

Education

M.S./1984/Geology/University of Southern California
B.S./1981/Geology/Bucknell University

Registration and Certifications

Certified Professional Geologist #9487, (AIPG) 1995
California Registered Geologist #5192, 1991
Pennsylvania Registered Geologist #PG-000529-G, 1994
OSHA – Approved 40 hour Health and Safety Training Course (1990)
OSHA - Approved 8 hour Health and Safety Training Refresher Courses (1991-Present)
OSHA-Approved 8-hour Site Safety Supervisor Training Course (2008)
National Ground Water Association
Long Island Association of Professional Geologists

Employment History

1993-Present	FPM Group
1992-1993	Chevron Research and Technology Co.
1990-1992	Chevron Manufacturing Co.
1984-1990	Chevron Exploration, Land, and Production Company

Continuing Education

- Treatment of Contaminated Soil and Rock
- Groundwater Pollution and Hydrology
- Environmental Law and Regulation
- Remedial Engineering
- Soil and Foundation Engineering
- Environmental Geochemistry

Detailed Experience

Environmental Data Analysis

- Received multiple sessions of environmental geochemistry training provided by environmental geochemists, including physical chemistry, thermodynamics, ionic interactions, complexation, biologic effects, and other basic principles. Training also included field sampling procedures and effects on chemical data, chemical analytical methods and equipment, and QA/QC procedures and interpretation.
- Reviewed and evaluated numerous soil, groundwater, product, indoor/ambient air and soil vapor chemical analytical datasets, including evaluation of batch and site-specific QA/QC samples, laboratory narratives, comparison to regulatory agency criteria, historic data, and background data.
- Developed and implemented numerous Quality Assurance Project Plans (QAPP), including QAPP design, sample delivery group (SDG) evaluations, sampling procedures and sequences, and QA/QC sample preparation/collection.
- Attended periodic environmental chemistry training sessions hosted by environmental laboratories and participated in hands-on training in data and QA/QC evaluation.
- Prepared Data Usability Summary Reports (DUSRs) for numerous chemical analytical datasets for projects overseen by the USEPA, NYSDEC and other regulatory agencies. Datasets evaluated have included soil, groundwater, soil vapor, indoor air, and ambient air.
- Performed forensic assessments of historic environmental chemical analytical data to resolve apparent discrepancies with modern data and other dataset inconsistencies.
- Assessed various leachate test protocols and results to determine the most applicable methods to evaluate and develop soil cleanup objectives for non-regulated compounds.
- Interpreted numerous organic parameter datasets to evaluate breakdown sequences, likely original parameters, and rates of degradation.
- Formulated numerous chemical treatment plans for insitu remediation of environment contaminants, including assessment of contaminant concentrations and distribution, chemical processes and indicators, natural attenuation indicators, additional stociometric demands, and hydrogeologic factors.

Site Investigations

- Provides oversight and coordination for ongoing investigation and remedial projects at several New York State Inactive Hazardous Waste Disposal Sites, Voluntary Cleanup Program Sites, and

Brownfield Cleanup Program Sites. Investigations have included site characterization, Remedial Investigation/ Feasibility studies, and RCRA Facility Investigations. Remedial Services have included contaminated soil removals; ORC and ARC injections; design, installation and operation of all sparge/soil vapor extraction systems; sub-slab depress investigation, capping, and other remedial services.

- Provides program coordination and oversight for all Phase I ESA, Phase II investigations, and remediation projects for a major commercial developer on Long Island, New York. Projects have included environmental services associated for the purchase and redevelopment of office buildings, aerospace facilities, former research and development facilities, and large manufacturing plants. Remedial Services have provided RCRA closures, UIC closures, tank removals, and Brownfield Cleanup Program projects.
- Planned and managed a Resource Conservation and Recovery Act (RCRA) Facilities Investigation (RFI) at Barksdale AFB, Louisiana for AFCEE. Responsible for all aspects of field program planning, solicitation and selection of subcontractors, mobilization and establishment of a field office, supervising multiple field crews, installation and sampling of monitoring wells, collection and soil samples, data tracking and management and preparation of an RFI report. The scope of work included characterization of the nature and extent of groundwater and soil contamination at thirteen Solid Waste Management Units (SWMUs), performing a base-wide evaluation of background contaminant concentrations, and developing a long-term groundwater monitoring program for the base.
- Managed field sampling crews for major underground storage tank (UST) investigation at Plattsburgh AFB, NY, for AFCEE. Responsible for field crew training, coordination of sampling crews at separate sites, sample labeling, handling, tracking, and shipping, field data management and remote field office management. The scope of work included collection of over 450 groundwater samples to characterize groundwater conditions in the vicinity of 150 USTs using a Geoprobe sampling rig, wellpoints, and rapid turnaround-time analysis.
- Managed site investigation activities, including soil vapor sampling, soil sampling and analysis, groundwater sampling and analysis, and geotechnical evaluation for numerous sites in Suffolk County, New York. The resulting data were utilized by a major supermarket company in the negotiations for the purchase of the properties and in the property remediation prior to development.
- Performed site investigation activities including soil vapor analysis, soil sample analysis, and groundwater sampling and analysis at an active commercial bus terminal in the Bronx, NY. Made recommendations for site remediation including UST removal, soil excavation and disposal, and free-phase product extraction.
- Prepared various work plans and reports, including a RCRA Facilities Investigation Work plan, incorporating existing geologic, chemical and historical data, evaluating newly-acquired site data, and developing recommendations for further investigation and remedial action at a City of Richmond former municipal landfill
- Managed on-site and off-site soil and ground-water sampling program at a manufacturing facility in Bay Shore, NY. Compiled resulting data and prepared a comprehensive report of the investigation results for the Suffolk County Department of Health Services (SCDHS) and NYS Department of Environmental Conservation (NYSDEC). Proposed remediation technologies for on-site soil contamination and on-site and off-site groundwater contamination.
- Managed and conducted a soil and groundwater sampling program using a Geoprobe sampler adjacent to Newark Airport Runway 29 for the Federal Aviation Administration. Analyzed resulting chemical analytical data and presented results to client.
- Supervised and conducted drilling, soil sampling, cone penetrometer testing, and well installation at a refinery process water effluent treatment system and former municipal landfill.
- Supervised drilling, installation, development, and sampling of monitoring wells at numerous sites in the greater New York metropolitan area. Utilized resulting stratigraphic, hydrologic, and chemical analytical data to evaluate site conditions.

Remediation

- Project Manager for all investigation and remedial activities at a NYSDEC Brownfield Cleanup Program site in New York City. Prepared the Remedial Investigation and Remedial Work Plan; coordinated with the owner, other contractors, and the NYSDEC; prepared for and conducted citizen participation activities; supervised all waste characterization, profile preparation, and waste management; developed the Final Engineering Report (FER) and Site Management Plan (SMP) for NYSDEC approval; and ensured that all remedial requirements were met such that the Certificate of Completion (COC) was issued. Continuing activities include coordination of the ongoing site management activities, communications with the NYSDEC and NYSDOH, and preparation of the annual Certification Report.
- Developed pilot test plans, evaluated pilot test results, and prepared conceptual designs for several air sparge/soil vapor extraction (AS/SVE) systems to treat petroleum and/or chlorinated

solvent VOCs. These systems were subsequently installed and Ms. Davis provides ongoing review of system operations and remedial monitoring results.

- In responsible charge of several task orders for waste characterization of a 90,000-cy construction soil stockpile at a municipal sewer facility. Responsibilities included development and implementation of Sampling and Analysis Plans (SAP), coordination of staffing, review of lab data, preparation of Field Sampling Summary Reports (FSSR), coordination with disposal facilities, and preparation of waste profiles.
- Designed soil remediation plan and managed contractor support for a metal parts plating and manufacturing facility in Suffolk County, New York. Soil remediation was overseen and approved by the SCDHS.
- Designed and performed indoor underground storage tank abandonment program, leaching pool remediation plan, and managed contractor support for a tape measure manufacturing facility in Suffolk County, New York. SCDHS provided oversight and approval.
- Participated in the design process for a groundwater containment and remediation system for a former municipal landfill, including subsurface groundwater barrier walls and extraction wells.
- Designed soil remediation plan and supervised contractor performance of soil remediation activities at an active construction site in Carle Place, NY. Project involved excavation and disposal of approximately 5,000 tons of PCB-, metal-, and petroleum-contaminated soil. NYSDEC provided oversight and approval of the completed remediation.
- Coordinated technical aspects of subsurface groundwater barrier wall construction, including routing, permitting, design, material selection, and field activities.

Hydrogeologic Evaluations

- Prepared Engineer's Report for Long Island Well Permit for a 230-gpm irrigation supply well. Responsible for evaluation of well interference, salt water upcoming, impacts from contaminants, and other factors affecting the proposed well.
- Performed well design (gravel pack size, screen size, etc.) for numerous groundwater wells on Long Island. Familiar with sieve analyses, well construction and development methods.
- Utilized Visual Modflow groundwater modeling program to evaluate the impact of a contaminant plume on a proposed SCWA wellfield. Model development included evaluation of recharge, aquifer properties, subsurface stratigraphy, boundary conditions, plume source and concentration, and various wellfield locations and pumping rates.
- Participated in a multi-day, multi-well aquifer pumping test for New York City Transit (NYCT) Lennox Avenue site. Responsible for operating and maintaining data logging equipment, coordinating manual water level measurements, and analyzing resulting drawdown data.
- Evaluated subsurface geologic conditions for NYCT Avenue T site utilizing existing boring logs, topographic, and historic map data.
- Supervised drilling, installation and development of groundwater extraction, injection, and monitoring wells at a USEPA Superfund site in Deer Park, New York. Interpreted aquifer and well performance from development data and made recommendations for modification of drilling and development procedures.
- Performed slug tests on monitoring wells at a New York City Transit Authority site, and evaluated hydrologic properties using the HYDROLOGIC ISOAQX computer program.
- Performed aquifer pumping and slug tests and evaluated hydrologic properties using the computer program AQTESOLV.
- Performed water level and water quality monitoring at an industrial site in Mattituck, NY. Constructed groundwater elevation contour maps and utilized chemical analytical data to predict contaminant plume migration.

Landfills

- Prepared work plans for Closure Investigations of two Town of East Hampton landfills. Each work plan included a Hydrogeologic investigation, methane investigation, surface leachate investigation, and vector investigation. Prepared final Closure Investigation Reports, which were accepted by the NYSDEC.
- Supervised the installation of groundwater and methane monitoring wells to complete the monitoring networks at the Town of East Hampton landfills. Services provided included hollow-stern auger and mud-rotary well installations, split-spoon soil sampling and boring log preparation, oversight and interpretation of wireline electric logging, and completion of initial baseline monitoring events.
- Supervises ongoing groundwater and methane monitoring programs for Town of East Hampton landfills. Responsibilities include field team coordination, communications with the Town, report scheduling, data package review, and report review prior to distribution to the client and NYSDEC.
- Performed groundwater sampling at a radio tower facility constructed on a landfill in NJ. Analyzed results and made recommendations to client.
- Conducted methane monitoring at Springs-Fireplace Road and Montauk Landfills for the Town of East Hampton.

- Used the PC-based modeling program FLOW PATH to predict groundwater flow directions and evaluate extraction well locations and pumping rates for a groundwater containment and remediation system at a former municipal landfill.
- Negotiated successfully with NYSDEC for reduced monitoring frequencies at Town of East Hampton based on historic monitoring results. Maintained quarterly monitoring frequency only for specific containments at key locations.
- Manages monthly methane monitoring for all Town of Islip landfills. Monitoring program includes onsite and offsite methane wells, methane collection systems, and flare systems. Data is recorded electronically and downloaded to computer for formatting prior to delivery to Town. Data is reported in final form within two days of collection.
- Supervises and reviews production of quarterly and annual monitoring reports for all monitoring programs at Town of Smithtown landfill. Project includes tabulation and reporting of groundwater and methane monitoring data, solid waste and recycling collection data, yard waste composting operations, and landfill leachate collection and disposal data. Multiple copies of each report are prepared for Town delivery to the NYSDEC.

Community Impacts

- Developed Community Monitoring Plans (CMP) for several hazardous waste sites. These plans included monitoring procedures, action levels, and mitigation measures for odors, traffic, noise, dust and/or vapors with the potential to affect surrounding communities during investigation and/or remediation. Each CMP was reviewed and approved by the NYSDEC and NYSDOH and was implemented under the oversight of these agencies.
- Developed and implemented an odor abatement plan for highly-odorous soil discovered during a remediation project in New York City. The remediation site was surrounded by three public schools and complaints of nuisance odors were received following discovery of the odorous soil, resulting in a job shutdown until the nuisance was abated. The odor abatement plan was prepared and implemented within 24 hours and involved immediate covering of the odorous soil followed by spot excavation and removal during non-school hours (night work) and the use of odor-controlling foam. The removal was completed within one week without further incident and the NYSDEC and NYSDOH approved the completed work, allowing the job to recommence.
- Attended and presented at numerous community meetings for various environmental sites to explain the purpose of CMPs, the types of observations and their interpretation, and mitigation measures. Addressed community and agency questions and issues.
- Evaluated and implemented abatement for vectors (rodents, flies, and seagulls) at several Long Island landfills in association with landfill closure. These activities included inspection and reporting of vector populations, development of vector abatement plans, and assisting Town personnel with vector abatement.
- Conducted inspections of intense fly infestations at a Town transfer station building. The inspections were used to identify the locations and migration pathways of flies inside the building and to develop an abatement plan. This plan was successfully implemented by Town personnel to abate the nuisance fly infestations.
- Developed and implemented air and soil vapor investigations of residential and commercial properties to evaluate potential air quality impacts. These investigations were conducted using plans approved by the NYSDEC and NYSDOH. The resulting data were used to evaluate whether air quality impacts were present and whether mitigation or monitoring were necessary. These evaluations were submitted for NYSDEC and NYSDOH review and approval, together with appropriate monitoring/mitigation designs.
- Conducted odor, dust, noise and organic vapor monitoring at several community areas surrounding environmental sites. Data were collected and interpreted in accordance with NYSDEC and/or NYSDOH guidance and the results were submitted to these agencies together with recommendations for mitigation, if appropriate.

Expert Witness/Technical Services

- Provided expert witness and technical services regarding environmental conditions and remedial procedures for a proposed residential redevelopment of a former oil terminal. Services included preparing and obtaining NYSDEC and NCDOH approval of remedial work plans for three environmental areas of concern, preparing remedial cost estimates and schedules, and providing testimony at a public hearing before the North Hempstead Town Board from which a change of zone was requested. The proposed change of zone, although subject to considerable public opposition, was approved, allowing redevelopment and associated remediation of the property to move forward.
- Provided expert witness and technical services to the legal team defending a petroleum company against NYSDEC cost recovery claims at a petroleum spill site. The spill site was complex, involving two very large petroleum releases at gasoline stations adjoining the defendant's property. Services provided included evaluating petroleum tank tests, groundwater, soil and soil vapor chemical analytical data, petroleum

fingerprint data, remediation activities and costs. Products prepared include numerous detailed timelines of various activities, large displays showing site information and subsurface conditions, and cost allocation calculations. A detailed subsurface investigation was also performed to evaluate stratigraphic conditions.

- Assisted the Village of Larchmont legal team in successfully opposing the construction of an IKEA superstore in the adjoining community of New Rochelle. Work performed included evaluating the previous environmental investigations of the proposed store site, developing cost estimates and scopes of work for a full environmental evaluation of the site, preparing scoping cost estimates for likely remediation scenarios, preparing technical documents in support of the Village of Larchmont's position and making a presentation at a large public hearing for the project. The proposed project was subsequently withdrawn.
- Provided technical evaluation of a proposed water district in the Town of Carmel in support of legal efforts to oppose the district. The proposed water district was opposed by existing residents due to limited available water supplies and likely impact on their existing wells. The scope of work included evaluation of aquifer pumping tests, determining impacts on nearby wells, assessment of likely increased water demand, preparation of several supporting documents, and presentations (including providing testimony to a judge) at project hearings. The proposed project was subsequently conditionally approved by the NYSDEC with significant modifications to protect the water rights of existing residents.

- Provided technical support to the Croton Watershed Clean Water Coalition (CWCWC) in assessing the impacts of several proposed road construction projects on the Kensico Reservoir and other nearby water bodies of the New York City water supply system. This work included evaluating stormwater pollutant loading calculations, assessing impacts to wetlands, promoting application of more accurate stormwater runoff calculation methods, assessing proposed stormwater management techniques, attending and making presentations at public meetings, preparing technical statements for submittal to regulatory agencies, and participating in the NYSDOT's Stormwater Pollution Prevention Plan (SPPP) Guidance committee.
- Prepared several affidavits regarding environmental conditions at client properties in support of pending legal actions. Issues evaluated included landfill issues, wetlands and navigable waterway issues, and petroleum spill issues.

Health and Safety

- Performed health and safety monitoring at investigation and remediation sites during intrusive activities. Monitoring included calibration and operation of photoionization detector (PID) and flame-ionization detector (FID) for organic vapors and combustible gas indicator (CGI) for methane. Compared results to applicable action levels and took preventative/protective measures as necessary.
- Performed community monitoring, including monitoring for noise, particulates (dust), and organic vapors. Recorded observations and compared to applicable action levels. Familiar with calibration and operation of noise meters, particulate monitors, and PID/FID.
- Performed screening for radiation at select sites. Familiar with operation of Geiger counter in different radiation modes and with background readings.

Miscellaneous Projects

- Performed numerous Phase I Site Assessments for residential and industrial sites on Long Island, New York.
- Conducted aquifer pumping and soil vapor extraction test training. Instructed classes for site investigation methods, aquifer pumping test analysis, and risk assessment.
- Performed various project management functions, including development and management of project
- Processed and interpreted seismic reflection data and constructed seismic velocity models.
- Evaluated site compliance with environmental regulations. Assisted and reviewed regulator's revision of proposed risk assessment-based UST cleanup guidelines. Reviewed proposed USEPA NPDES permits for remediation system effluent.
- Constructed and interpreted structural and stratigraphic cross sections, and structure contour, fault surface, isochore, and isopach maps.

APPENDIX D
HEALTH AND SAFETY PLAN

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CASTLETON ENVIRONMENTAL

HEALTH AND SAFETY PLAN
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK
OCTOBER 2025
NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER: ZDEZ2501

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1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during the planned Environmental Site Investigations and Remediation to be performed the site located at 655-671 Stanley Avenue, Brooklyn, New York (the site). Castleton Environmental Geologic Services DPC (Castleton) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. Castleton has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy.

2.0 INTRODUCTION

2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by site workers participating in investigation activities at the project site located at 655-671 Stanley Avenue, Brooklyn, New York.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by Castleton, its' subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. Castleton sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to Castleton.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 CFR Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the Castleton Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the site following consultation with the HSM and the Field Team Leader (FTL).

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2.2 Scope

This HASP addresses the potential hazards related to environmental investigation and remediation activities. The primary environmental investigation activities include the following:

- Site Mobilization/Demobilization;
- Geophysical Survey Activities;
- Groundwater Monitoring Well Installation;
- Groundwater Sampling;
- Soil Vapor Intrusion (SVI) Investigation and Sampling

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical Hazards
- Biological Hazards
- Physical Hazards

2.3 Application

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

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

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

3.1 Project Manager (Frank Castellano, PG, Jessica Ferngren, PG)

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before site work is conducted; and
- Has the overall project responsibility for project health and safety.

3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO) (John Zator/Jessica Ferngren, PG)

- Ensures that the HASP is implemented in conjunction with the Health and Safety Manager (HSM);
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;

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- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

3.3 Health and Safety Manager (Jessica Ferngren)

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

3.4 Site Personnel (John Zator, Jessica Ferngren, PG)

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

4.0 SITE HISTORY AND PROJECT DESCRIPTION

4.1 Project Background

This HASP has been prepared by Castleton in response to comply with the Site Characterization Work Plan dated October 2024. The scope of work includes:

- Geophysical Survey Activities;
- Groundwater Monitoring Well Installation;
- Groundwater Sampling;
- Soil Vapor Intrusion (SVI) Investigation and Sampling

4.2 Site Location and Description

The site is located at 655-671 Stanley Avenue, Brookyln, New York. The site consists of one (1) irregular-shaped parcel with an estimated area of 0.34 acres in size. The site is improved with one (1) commercial building with one (1) floor, full basement, and asphalt-paved parking lots in the front and rear of the building which is at basement grade. The building has an estimated gross floor area of 11,330 square feet and contains a total of three (3) commercial units (City Fresh Market, one (1) vacant unit formerly occupied by a dry cleaner and Tex's Chicken & Burgers). A review of the New York City Building Department property profile overview indicated that the existing building was constructed in 1950. The building occupies the majority of the parcel and is bordered by landscaped areas, municipal walkways, and right-of-ways.

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Previous investigations conducted for due diligence purposes identified elevated chlorinated volatile organic compounds (VOCs) including tetrachloroethene (PCE) in groundwater, indoor air, and subsurface vapor. At the time of the previous investigations, the dry cleaner on site was active.

Since the property was transferred to the current owner, the dry cleaner is no longer active. The dry cleaner ceased operations in May 2023.

In February 2024, Castleton completed a Remedial Investigation. The objective of this investigation was to further assess on-site subsurface quality in relation to former on-site dry cleaning operations. This objective was met by the performance of a geophysical survey, monitoring well installation and survey, and the collection and laboratory analysis of sediment, groundwater, air and vapor samples.

During the geophysical survey, accessible areas grocery store and former dry cleaning tenant space basement were inspected and scanned. Sumps and floor drains were observed connected to municipal sewer. Additionally, dry cleaning machine support posts were observed adjacent to the main sump pit. Two direct discharge drywells were observed in the rear parking lot area.

Six monitoring wells were installed, developed, and surveyed. Two groundwater gauging and sampling events occurred in January and February 2024. Groundwater flows towards the southeast. Elevated PCE concentrations were observed in groundwater with the highest concentration at 9.4 ug/l in monitoring well MW01 located downgradient of the former dry cleaner. Elevated concentrations of chloromethane were observed, during the second sampling event, however, these concentrations do not appear to be indicative of an onsite source since chloromethane was observed in the upgradient well MW05.

Sediment analytical results reported elevated concentrations of VOCs, semi-volatile organic compounds (SVOCs), and metals in the two drywells sampled.

Two sub-slab vapor and five indoor air samples were collected, and laboratory analyzed for VOCs. The NYSDOH recommended action for PCE is to “Mitigate”.

The indoor air concentrations were also compared to NYSDOH Air Guidance Values for PCE, trichloroethene (TCE), and methylene chloride. The concentrations of these chemicals were reported below AGVs in all five indoor air samples analyzed. This suggested that the soil vapor intrusion pathway is not complete.

Based on the overall dataset, and the current use of the building Castleton recommended that no further action is necessary regarding a soil vapor intrusion condition and the current building slab is mitigating vapors from entering building at levels that would require treatment.

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Based on the overall dataset, on February 26, 2024, NYSDEC was notified, and Spill # 2309256 was assigned.

As per the Chemical Removal Summary Letter, dated July 30, 2024, the equipment, chemicals, and clothing were removed from the former dry cleaner tenant space in May 2024 to prepare the tenant space to be rented.

Castleton completed the Drywell Remedial Summary in July 2024. The scope of work to remediate the impacted structures consisted of removing liquid and soil from two (2) drywells (UIC01 and UIC02). Remedial activities were performed by PAL Environmental Services Inc. (PAL) of Long Island City, New York, with direction and oversight provided by Castleton. Remedial efforts were conducted on two parking lot drywells (UIC01 and UIC02) on June 11, 2024. 688 gallons of liquids were removed and properly disposed at Clean Waters of New York of Staten Island, New York. Approximately 1.91 tons of sediment were removed from the stormwater drywells and disposed of as non-hazardous waste at Dale Transfer Corporation of West Babylon, New York and Dale Transfer of West Babylon, New York.

Soil and groundwater endpoint samples were collected from each structure to assess the effectiveness of the remedial effort.

Soil endpoint sample results reported concentrations of VOCs and SVOCs as non-detect or below applicable criteria. Soil analytical results reported concentration of one metal, chromium, above Unrestricted Use and Protection of Groundwater SCOs in drywell UIC01. All other metals were reported as non-detect or below Unrestricted Use and Protection of Groundwater SCOs.

Groundwater analytical results reported concentration of VOCs, SVOCs, and metals above applicable criteria.

Castleton concluded that soil remediation within the drywells has been completed to the extent possible. Castleton recommended that groundwater remedial actions be addressed under a separate cover.

5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under Section 1.0. Additional information can be found in Appendix A - Safety Data Sheets or in Appendix B - Activity Hazard Analyses.

5.1 Chemical Hazards

Potential on-site chemicals of concern include VOCs, in particular PCE and chromium.

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The chemicals identified above may have an effect on the central nervous system, entering the body through the respiratory system and dermal exposure. Acute exposure symptoms may include skin irritation. Specific information on the chemicals can be found in Table 5-1.

Table 5-1 Chemical Hazards

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS
VOCs (PCE, chloromethane)	127-18-4 74-87-3	TWA 100 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system
SVOCs			Inhalation Ingestion Skin/Eye	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system
Pesticides/PCBs			Inhalation Ingestion Skin/Eye	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system
Metals			Inhalation Ingestion Skin/Eye	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system

Abbreviations

C = Ceiling limit, not to be exceeded
CNS = Central Nervous System
PEL=Permissible Exposure Limit
OSHA = Occupational Safety and Health Administration
ppm = parts per million
TWA = Time-weighted average (8 hours)

5.2 Biological Hazards

Work will be performed in a developed area of Brooklyn, New York. During the project, there is potential for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in Appendix B includes specific hazards and control measures for each task, if applicable.

5.2.1 Animals

The Site is in a predominantly developed area. It is possible that dogs, cats, rats and mice may be present. Workers shall use discretion and avoid all contact with animals.

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5.2.2 Insects

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

5.2.3 Plants

Poison ivy, sumac and oak may be present on site. The FTL/SHSO should identify the susceptible individuals. Worker shall avoid all contact with these plants.

5.2.4 COVID-19

There are many types of coronaviruses including some that commonly cause mild upper-respiratory tract illnesses. COVID-19 is a disease, caused by a novel (or new) coronavirus that has not been seen in humans. The virus that causes COVID-19 is thought to spread mainly from person to person, mainly through respiratory droplets produced when an infected person coughs, sneezes, or talks. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Spread is more likely when people are in close contact with one another (within 6 feet). To prevent the spread of COVID-19, at a minimum, the following steps will be taken:

- Stay home if sick.
- Keep physical distance. Stay at least 6 feet away from other people.
- Wear a face covering.
- Keep your hands clean.

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5.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in Appendix B for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

5.3.1 Temperature Extremes

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

Castleton's Heat/Cold Stress Protocols are specified in Appendix C.

5.3.2 Steam, Heat and Splashing

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

5.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

5.3.4 Fire and Explosion

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

5.3.5 Manual Lifting/Material Handling

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

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5.3.6 Slips, Trips and Falls

Working in and around the site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

5.3.7 Heavy Equipment Operation

Drilling equipment be used where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

5.3.8 Electrocution

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

6.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by Castleton for the following phases of work:

- Site Mobilization/Demobilization;
- Groundwater Monitoring Well Installation;
- Groundwater Sampling;
- Soil Vapor Intrusion Investigation Sampling;
- Investigative Derived Waste Management.

Copies of these AHAs are included in Appendix B of this HASP.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in Table 7-1 represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and Appendix B - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by Table 7-1, the FTL/SHSO will conduct the hazard assessment, select the PPE, and

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document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

7.1 PPE Abbreviations

HEAD PROTECTION
HH = Hard Hat

HEARING PROTECTION
EP = ear plugs
EM = ear muffs

EYE/FACE PROTECTION
APR = Full Face Air Purifying Respirator
MFS = Mesh Face shield
PFS =Plastic Face shield
SG = ANSI approved safety glasses with side shields

FOOT PROTECTION
Neo = Neoprene
OB = Overboot
Poly = polyethylene coated boot
Rub = rubber slush boots
STB = Leather work boots with steel toe

HAND PROTECTION
Cot = cotton
But = Butyl
LWG = Leather Work Gloves Neo = Neoprene
Nit = Nitrile
Surgical

BODY PROTECTION
WC = work clothes
Cot Cov = Cotton Coveralls
Poly = Polyethylene coated Tyvek® coveralls
Saran = Saranex coated coveralls
Tyvek® = Uncoated Tyvek® coveralls

RESPIRATORY PROTECTION
APR = Full-face air purifying respirator with organic vapor cartridges
ASR = Full face air supplied respirator with escape bottle
SCBA = Self-contained breathing apparatus

7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present;
- Work operations to be performed;
- Potential routes of exposure;
- Concentrations of contaminants present; and
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

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A review of the analytical data from previous sampling events indicates that VOCs identified in Table 5-1 are the primary contaminants of concern.

The exposure routes for these chemicals are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/ Demobilization	HH	SG	STB	WG	WC	None	None
Groundwater Monitoring Well Installation	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceed
Groundwater Sampling	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceed
Soil Vapor Intrusion Investigation Sampling	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceed
Investigative Derived Waste Management	HH	SG	STB	WG, Nit & Sur as needed	WC, Tyvek® as needed	None	None initially APR if action levels exceed

Table 7-1
Personal Protective Equipment Selection

7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed to comply with 29 CFR.

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If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

1. Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first; and
2. If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short of time period they were used the day before.

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants;
- Using the Rule of Thumb provided by the AIHA;
- All of the chemicals have boiling points greater than 70^{o}C;
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (eg, overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration;
- Relative humidity;
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature;
- Mixtures of contaminants;
- Accuracy in the determination of the conditions;
- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;
- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;

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- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

8.0 AIR MONITORING

Air monitoring will be performed for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at the site. Air monitoring will be used to help to confirm that the remedial work will not spread contamination off-site through the air. Site monitoring with a photoionization detector (PID) will be performed during any invasive activities.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the site perimeter, during intrusive activities such as excavation activities.

9.0 ZONES, PROTECTION AND COMMUNICATION

9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety equipment will be located in this zone. Potentially contaminated

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personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

Contamination Reduction Zone - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed, or different hazards exist. The size of the EZ shall be determined by the site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Control

Decontamination areas will be established for drilling/sampling activities.

9.2.1 Personnel Decontamination Station

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated because of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.

All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

9.3 Communication

- Each team member will have a cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site- specific training. Typical hand signals are the following:

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist.	Leave the area immediately, no debate.

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Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand.
Thumbs down	No, negative.

10.0 MEDICAL SURVEILLANCE PROCEDURES

All contractor and subcontractor personnel performing field work where potential exposure to contaminants exists at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste site work if the last examination was not taken within the previous six months.

Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other site conditions warrant further medical surveillance.

10.2 Medical Data Sheet

A medical data sheet is provided in Appendix D. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

11.0 SAFETY CONSIDERATIONS

11.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in Appendix E. The work rules will be posted in a conspicuous location at the site.

11.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

11.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged to prevent spillage or breakage.

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Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, to assure that the practices are appropriate for the suspected contaminants in the sample.

11.4 Excavation

Excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

13.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures which are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

13.1 Responsibilities

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13.1.1 Health and Safety Manager (HSM)

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

13.1.2 Field Team Leader/Site Health and Safety Officer (FOL/HSO)

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

13.1.3 Emergency Coordinator

The Emergency Coordinator for the project is the FTL/SHSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts the emergency coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The emergency coordinator will locate emergency phone numbers and identify hospital routes prior to beginning work on site. The emergency coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

13.1.4 Site Personnel

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency.

13.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

13.2.1 Hand Signals

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

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13.2.2 Field Radios and Cell Phones

Castleton field personnel are provided cellular phones for site communication and emergency use.

13.3 Local Emergency Support Units

A route map from the site to the nearest hospital can be found in Appendix F. This map will be placed with the above emergency telephone numbers in all on-site vehicles.

13.4 Pre-Emergency Planning

Castleton will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to any of the contaminants expected to be found on the site.

Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet (Appendix D). These data sheets will be filled out during site-specific training and will be kept on the site.

In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and must be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

Table 13-1
Emergency Telephone Numbers

Contact	Firm or Agency	Telephone Number
Police		911
Fire		911
Hospital	Jamaica Hospital	(718)647-0240
Ambulance		911
Project Manager/Health and Safety Manager	Jessica Ferngren Castleton	(631) 482-1818 (631)416-2660
Health & Safety Officer	Jessica Ferngren Castleton	(631) 482-1818 (631)416-2660

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Alternate Health & Safety Officer	Frank Castellano Castleton	(631) 482-1818 (631)416-1222
Poison Control Center		(800) 962-1253
Chemtrec		(800) 424-9300

13.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the FTL/SHSO immediately. First aid equipment will be available on site at the following locations:

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least two people with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. A map and directions to the hospital can be found in Appendix F.

13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas

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and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

13.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

13.7.1 Fire Prevention

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.
-

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13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

13.9 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The FTL/SHSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on-site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is not a Castleton employee

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Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in Appendix G. If the employee involved is not a Castleton employee, his employer will receive a copy of the report.

13.11 Adverse Weather Conditions

In the event of adverse weather conditions, the FTL/SHSO will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries;
- Potential for cold stress and cold-related injuries;
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds);
- Limited visibility (fog);
- Potential for electrical storms;
- Earthquakes; and
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The FTL/SHSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

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13.13 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

14.0 TRAINING

14.1 General Health and Safety Training

In accordance with Castleton corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard.

Personnel who have not met the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

14.1.1 Three Day Supervised On the Job Training

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

14.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 1910.120 requirements and related company programs and procedures.

14.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

14.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily

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Briefing Sign-In Sheet is contained in Appendix H. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

14.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

14.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three-day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in Appendix G.

15.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

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16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

Name (Print and Sign)	***Date***

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APPENDIX A
SAFETY DATA SHEETS

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SAFETY DATA SHEET

Revision Date 01-Apr-2024 **Revision Number** 3

1. Identification

Product Name **Hexavalent Chromium, standard solution, Specpure®, Cr(+6) 1000µg/ml**

Cat No. : **42234**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757

Emergency Telephone Number
For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

Label Elements

Signal Word
Danger

Hazard Statements
May cause genetic defects
May cause cancer
May damage fertility or the unborn child



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Response
IF exposed or concerned: Get medical attention/advice
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	99.76
Ammonium bichromate	7789-09-5	0.24

4. First-aid measures

General Advice — If symptoms persist, call a physician.

Eye Contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact — Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation — Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion — Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects — None reasonably foreseeable.

Notes to Physician — Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media — Not combustible.

Unsuitable Extinguishing Media — No information available

Flash Point — No information available

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
None reasonably foreseeable.

Hazardous Combustion Products
Nitrogen oxides (NOx). Ammonia. Chromium oxide.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	-

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information. Do not allow material to contaminate ground water system. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Ammonium bichromate	TWA: 0.0002 mg/m³ STEL: 0.0005 mg/m³ Skin	(Vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³	IDLH: 15 mg/m³ TWA: 0.0002 mg/m³	TWA: 0.05 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard

EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Organic gases and vapours filter. Particulates filter conforming to EN 143.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	4 (1%)
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	23 hPa @ 20 °C
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	(NH4)2 Cr2 O7 in H2 O

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nitrogen oxides (NOx), Ammonia, Chromium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Ammonium bichromate	LD50 = 48 mg/kg (Rat)	LD50 = 1860 mg/kg (Rabbit)	LC50 = 0.2 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Ammonium bichromate	7789-09-5	Group 1	Known	A1	X	A1

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects California Proposition 65. Reproductive toxicity.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Ammonium bichromate	7789-09-5	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Ammonium bichromate	7789-09-5	Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Ammonium bichromate	7789-09-5	X	-	232-143-1	X	X	X	X	X	KE-01653

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting threasholds
Ammonium bichromate	7789-09-5	0.24	0.1 % 1.0 %	-

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ammonium bichromate	X	10 lb	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ammonium bichromate	X		-

OSHA - Occupational Safety and Health Administration — Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Ammonium bichromate	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Ammonium bichromate	10 lb	-	10 lb 4.54 kg

California Proposition 65 — This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Ammonium bichromate	7789-09-5	Carcinogen Developmental Female Reproductive Male Reproductive	-	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Ammonium bichromate	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security — This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade — No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Water	7732-18-5	-	-	-
Ammonium bichromate	7789-09-5	Carcinogenic Category 1B, Mutagenic Category 1B, Toxic for reproduction Category 1B Article 57 Application date: March 21, 2016 Sunset date: September 21, 2017 Exemption - None	Use restricted. See item 72. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 30. (see link for restriction details) Use restricted. See item 29. (see link for restriction details) Use restricted. See item 75. (see link for restriction details) Use restricted. See item 47. (see link for restriction details) Use restricted. See item 65. (see link for restriction details)	SVHC Candidate list - 232-143-1 - Carcinogenic, Article 57a;Mutagenic, Article 57b;Toxic for reproduction, Article 57c

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links
https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Ammonium bichromate	7789-09-5	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Ammonium bichromate	7789-09-5	Not applicable	Not applicable	Not applicable	Annex I - Y21

16. Other information

Prepared By
Health, Safety and Environmental Department
Email: chem.techinfo@thermofisher.com
www.thermofisher.com

Revision Date 01-Apr-2024
Print Date 01-Apr-2024
Revision Summary New emergency telephone response service provider.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

APPENDIX B
ACTIVITY HAZARD ANALYSES

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

Project Identification	Location 655-671 Stanley Avenue Brooklyn, New York	Estimated Dates TBD
Phase of Work Mobilization/ Demobilization	**Page 1 of 1**	**Analysis Approved by** Jessica Ferngren, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Mobilization and demobilization of equipment, tools, personnel.	Slips/trips/falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Vehicular traffic	• Spotters will be used when backing up trucks and heavy equipment and when moving equipment.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification	Location 655-671 Stanley Avenue Brooklyn, New York	Estimated Dates TBD
Phase of Work Soil Vapor Point Installation	Page 1 of 2	Analysis Approved by Jessica Ferngren, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Drill with auger rig within in sidewalk to a terminal depth of 10 feet below grade	Chemical hazards	• Wear appropriate PPE per Table 5-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
2. Install well materials	Dust control	• Wear appropriate PPE including face masks, eye protection. • Use water when saw cutting for suppression of dust; • Be aware of dust accumulation while working and take breaks as needed; • Open garage doors to allow for fresh air through work space.
3. Work on public sidewalk	Odor Control	• Wear appropriate PPE per Table 5-1; • Limit the area of open excavations; • Shroud open excavations with tarps and other coverings; • Use of foams to cover exposed odorous soils; • Take breaks as necessary; • Open garage doors to allow for fresh air through work space.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Heavy equipment	• Ground personnel will stay clear of suspended loads; • Ground personnel will stay out of the swing radius; • Eye contact with operators will be made before approaching equipment; • Equipment will not be approached on blind sides; • Equipment will be equipped with backup alarms or spotters shall be used.

	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads. • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. • Disposable ear plugs or other hearing protection required when working near noisy equipment.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible, tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification	Location 655-671 Stanley Avenue Brooklyn, New York	Estimated Dates TBD
Phase of Work Groundwater Sampling	Page 1 of 2	Analysis Approved by Jessica Ferngren, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Groundwater Sampling	Chemical hazards	• Wear appropriate PPE per Table 5-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Dust control	• Wear appropriate PPE including face masks, eye protection. • Use water when saw cutting for suppression of dust; • Be aware of dust accumulation while working and take breaks as needed; • Open garage doors to allow for fresh air through work space.
	Odor Control	• Wear appropriate PPE per Table 5-1; • Limit the area of open excavations; • Shroud open excavations with tarps and other coverings; • Use of foams to cover exposed odorous soils; • Take breaks as necessary; • Open garage doors to allow for fresh air through work space.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads. • Overhead hazards will be identified prior to commencing work operations.

	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. • Disposable ear plugs or other hearing protection required when working near noisy equipment.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible, tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification	Location 655-671 Stanley Avenue Brooklyn, New York	Estimated Dates TBD
Phase of Work Soil Vapor Intrusion Sampling	Page 1 of 2	Analysis Approved by Jessica Ferngren, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Sub-slab vapor and ambient air sampling	Chemical hazards	• Wear appropriate PPE per Table 5-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Dust control	• Wear appropriate PPE including face masks, eye protection. • Use water when saw cutting for suppression of dust; • Be aware of dust accumulation while working and take breaks as needed; • Open garage doors to allow for fresh air through work space.
	Odor Control	• Wear appropriate PPE per Table 5-1; • Limit the area of open excavations; • Shroud open excavations with tarps and other coverings; • Use of foams to cover exposed odorous soils; • Take breaks as necessary; • Open garage doors to allow for fresh air through work space.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads. • Overhead hazards will be identified prior to commencing work operations.

	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. • Disposable ear plugs or other hearing protection required when working near noisy equipment.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible, tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification	Location 655-671 Stanley Avenue Brooklyn, New York	Estimated Dates TBD
Phase of Work Investigative Derived Waste Handling	Page 1 of 2	Analysis Approved by Jessica Ferngren, PM/HSM

TASKS	HAZARDS	CONTROL MEASURES
1. Waste into 55-gallon drums	Chemical hazards	• Wear appropriate PPE per Table 5-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
2. Lifting and transporting 55-gallon drums	Dust control	• Wear appropriate PPE including face masks, eye protection. • Use water when saw cutting for suppression of dust; • Be aware of dust accumulation while working and take breaks as needed; • Open garage doors to allow for fresh air through work space.
	Odor Control	• Wear appropriate PPE per Table 5-1; • Limit the area of open excavations; • Shroud open excavations with tarps and other coverings; • Use of foams to cover exposed odorous soils; • Take breaks as necessary; • Open garage doors to allow for fresh air through work space.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Excavation hazards	• Follow 29 CFR 1926 Subpart P.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads. • Overhead hazards will be identified prior to commencing work operations.

	Noise	• Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear heating protective devices. • Disposable ear plugs or other hearing protection required when working near noisy equipment.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible, tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

SAFETY DATA SHEET
CHROMIUM HARD,TRIVALENT

1. Identification

Product identifier

Product name CHROMIUM HARD,TRIVALENT

Product number 2403

Recommended use of the chemical and restrictions on use

Application Industrial Use

Details of the supplier of the safety data sheet

Supplier

SIFCO Applied Surface Concepts
5708 E. Schaaf Road
Independence, Ohio 44131
U.S.A.
Tel.: +1 216-524-0099
Fax: +1 216-524-6331
E-Mail: info@sifcoasc.com

Emergency telephone number

Emergency telephone CHEMTREC (United States) (800) 424-9300; CHEMTREC (International) +1 703-527-3887

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Not Classified

Health hazards Skin Corr. 1B - H314 Eye Dam. 1 - H318 STOT SE 3 - H335

Environmental hazards Aquatic Acute 3 - H402

Label elements

Pictogram



Signal word Danger

Hazard statements H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H402 Harmful to aquatic life.

CHROMIUM HARD,TRIVALENT

Precautionary statements

P260 Do not breathe vapor/ spray.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304+P340 If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P363 Wash contaminated clothing before reuse.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/ container in accordance with national regulations.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P284 [In case of inadequate ventilation] wear respiratory protection.
P301+P310 If swallowed: Immediately call a poison center/ doctor.
P302+P352 If on skin: Wash with plenty of water.

Contains AMMONIUM FORMATE, CHROMIUM (III) SULPHATE, AMMONIA ...%

Other hazards

This product does not contain any substances classified as PBT or vPvB.

3. Composition/information on ingredients

Mixtures

AMMONIUM FORMATE **25-30%**

CAS number: 540-69-2

Classification
Skin Irrit. 2 - H315
Eye Irrit. 2 - H319
STOT SE 3 - H335

AMMONIUM CHLORIDE **5-10%**

CAS number: 12125-02-9

Classification
Acute Tox. 4 - H302
Eye Irrit. 2 - H319

CHROMIUM (III) SULPHATE **5-10%**

CAS number: 10101-53-8

Classification
Acute Tox. 4 - H302
Acute Tox. 4 - H312
Acute Tox. 4 - H332
Skin Corr. 1B - H314
Eye Dam. 1 - H318
STOT SE 3 - H335

CHROMIUM HARD,TRIVALENT

Potassium Sulfate	**1-5%**
CAS number: 7778-80-5	
Classification Not Classified	

AMMONIA ...%	**1-5%**
CAS number: 1336-21-6 M factor (Acute) = 1	
Classification Skin Corr. 1B - H314 Eye Dam. 1 - H318 STOT SE 3 - H335 Aquatic Acute 1 - H400	

SODIUM BROMIDE	**<1%**
CAS number: 7647-15-6	
Classification Acute Tox. 4 - H312	

The full text for all hazard statements is displayed in Section 16.

4. First-aid measures

Description of first aid measures

Inhalation Move affected person to fresh air at once. Get medical attention.

Ingestion Get medical attention immediately. Do not induce vomiting.

Skin Contact Remove contaminated clothing immediately and wash skin with soap and water. Continue to rinse for at least 15 minutes and get medical attention.

Eye contact Remove affected person from source of contamination. Rinse immediately with plenty of water. Continue to rinse for at least 15 minutes and get medical attention.

Most important symptoms and effects, both acute and delayed

Inhalation Coughing, chest tightness, feeling of chest pressure.

Ingestion May cause chemical burns in mouth and throat. May cause stomach pain or vomiting.

Skin contact May cause serious chemical burns to the skin.

Eye contact Causes severe burns. May cause serious eye damage.

Indication of immediate medical attention and special treatment needed

Notes for the doctor No specific recommendations.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

Special hazards arising from the substance or mixture

CHROMIUM HARD,TRIVALENT

Specific hazards Corrosive gases or vapors.

Advice for firefighters

Protective actions during firefighting Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

Special protective equipment for firefighters Use protective equipment appropriate for surrounding materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapors. Provide adequate general and local exhaust ventilation.

Environmental precautions

Environmental precautions Do not discharge into drains or watercourses or onto the ground. Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Methods for cleaning up Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate. Flush contaminated area with plenty of water. Avoid the spillage or runoff entering drains, sewers or watercourses. Collect and dispose of spillage as indicated in Section 13. Wash thoroughly after dealing with a spillage.

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

7. Handling and storage

Precautions for safe handling

Usage precautions Avoid spilling. Avoid contact with skin and eyes. Avoid inhalation of vapors and spray/mists. Provide adequate general and local exhaust ventilation.

Conditions for safe storage, including any incompatibilities

Storage precautions Store in tightly-closed, original container in a dry, cool and well-ventilated place. Protect from freezing and direct sunlight.

Storage class Corrosive storage.

Specific end uses(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.

8. Exposure controls/Personal protection

Exposure controls

Protective equipment



Appropriate engineering controls As this product contains ingredients with exposure limits, process enclosures, local exhaust ventilation or other engineering controls should be used to keep worker exposure below any statutory or recommended limits, if use generates dust, fumes, gas, vapor or mist.

Eye/face protection Tight-fitting safety glasses.

CHROMIUM HARD,TRIVALENT

Hand protection	It is recommended that chemical-resistant, impervious gloves are worn. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. It is recommended that gloves are made of the following material: Nitrile rubber.
Other skin and body protection	Appropriate footwear and additional protective clothing complying with an approved standard should be worn if a risk assessment indicates skin contamination is possible.
Hygiene measures	Do not eat, drink or smoke when using this product. Wash at the end of each work shift and before eating, smoking and using the toilet.
Respiratory protection	If ventilation is inadequate, suitable respiratory protection must be worn. Respiratory protection must be used if the airborne contamination exceeds the recommended occupational exposure limit.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquid.
Color	Dark. Blue.
Odor	Acidic.
pH	pH (concentrated solution): 6.0-7.0
Initial boiling point and range	100°C/212°F @
Relative density	1.150-1.180
Other information	Not available.

10. Stability and reactivity

Reactivity	There are no known reactivity hazards associated with this product.
Stability	Stable at normal ambient temperatures and when used as recommended.
Possibility of hazardous reactions	Under normal conditions of storage and use, no hazardous reactions will occur.
Conditions to avoid	Avoid excessive heat for prolonged periods of time.
Materials to avoid	None known.
Hazardous decomposition products	None at ambient temperatures.

11. Toxicological information

Information on toxicological effects

Acute toxicity - oral

ATE oral (mg/kg)	4,284.49

Acute toxicity - dermal

ATE dermal (mg/kg)	19,400.35

Acute toxicity - inhalation

ATE inhalation (vapours mg/l)	194.0

CHROMIUM HARD,TRIVALENT

Inhalation	Vapors irritate the respiratory system.
Ingestion	Causes severe burns. May cause chemical burns in mouth, esophagus and stomach.
Skin Contact	May cause serious chemical burns to the skin.
Eye contact	Causes serious eye damage. Immediate first aid is imperative.
Acute and chronic health hazards	May cause burns in mucous membranes, throat, esophagus and stomach.
Route of exposure	Ingestion Inhalation Skin and/or eye contact

Toxicological information on ingredients.

AMMONIUM FORMATE

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	2,250.0
Species	Mouse
ATE oral (mg/kg)	2,250.0

CHROMIUM (III) SULPHATE

Acute toxicity - oral	
ATE oral (mg/kg)	500.0
Acute toxicity - dermal	
ATE dermal (mg/kg)	1,100.0
Acute toxicity - inhalation	
ATE inhalation (vapours mg/l)	11.0

Potassium Sulfate

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	6,600.0
Species	Rat
ATE oral (mg/kg)	6,600.0

AMMONIA ...%

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	350.0
Species	Rat

SODIUM BROMIDE

Acute toxicity - oral

Acute toxicity oral (LD_{50} mg/kg)	3,500.0
Species	Rat
ATE oral (mg/kg)	3,500.0

Acute toxicity - dermal

Acute toxicity dermal (LD_{50} mg/kg)	2,000.0
Species	Rabbit
ATE dermal (mg/kg)	2,000.0

12. Ecological information

Ecotoxicity The product contains a substance which may have hazardous effects on the environment.

Toxicity No data available.

Ecological information on ingredients.

Potassium Sulfate

Acute aquatic toxicity

Acute toxicity - fish LC_{50}, 96 hour: 680 mg/l, Pimephales promelas (Fat-head Minnow)

AMMONIA ...%

Acute aquatic toxicity

$LE(C)_{50}$	0.1 < L(E)C50 ≤ 1
M factor (Acute)	1
Acute toxicity - fish	LC_{50}, 96 hours: 0.53 mg/l, Freshwater fish LC_{50}, 96 hours: 0.75 -3.4 mg/l, Freshwater fish LC_{50}, 96 hours: 8.2 mg/l, Freshwater fish
Acute toxicity - aquatic invertebrates	EC_{50}, 48 hours: 0.66 mg/l, Daphnia magna

SODIUM BROMIDE

Acute aquatic toxicity

Acute toxicity - fish	NOEC, 96 hour: 7800 mg/l, Oryzias latipes (Red killifish) LC_{50}, 96 hour: 160,000 mg/l, Poecilia reticulata (Guppy)
Acute toxicity - aquatic invertebrates	NOEC, 48 hour: 7800 mg/l, Daphnia magna EC_{50}, 48 hours: 5800 mg/l, Daphnia magna

Persistence and degradability

Persistence and degradability No data available.

Bioaccumulative potential

Bio-Accumulative Potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil

Mobility The product is soluble in water.

CHROMIUM HARD,TRIVALENT

Other adverse effects

Other adverse effects Not determined.

13. Disposal considerations

Waste treatment methods

General information Disposal of this product, process solutions, residues and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements.

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

14. Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DOT).

UN Number

UN No. (International) Not applicable.

UN proper shipping name

Proper shipping name (International) Not applicable.

Proper shipping name (DOT) NOT RESTRICTED LIQUID

Transport hazard class(es)

Transport Labels (International) No transport warning sign required.

Packing group

Packing group (International) Not applicable.

Environmental hazards

Environmentally Hazardous Substance
No.

Special precautions for user

Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

National regulations The customer is advised to check if there are specific local or national regulations specifically applicable to the chemicals contained in the product. The hazards statement for this product is in accordance with international regulations, always observing the most stringent requirements.

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
Exempt.

CHROMIUM HARD,TRIVALENT

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)

Ammonium Chloride
Final CERCLA RQ: 5,000 lbs
Chromium Sulphate
Final CERCLA RQ: 1,000 lbs

SARA Extremely Hazardous Substances EPCRA Reportable Quantities

Exempt.

SARA 313 Emission Reporting

Chromium Sulphate

CAA Accidental Release Prevention

HAP
Chromium Sulphate

SARA (311/312) Hazard Categories

Acute
Chronic

OSHA Highly Hazardous Chemicals

Exempt.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins

Chromium Sulphate

California Directors List of Hazardous Substances

Ammonium Chloride
Chromium Sulphate

Inventories

US - TSCA

All ingredients are present.

16. Other information

Classification abbreviations and acronyms	Acute Tox. = Acute toxicity Carc. = Carcinogenicity Eye Dam. = Serious eye damage Eye Irrit. = Eye irritation Flam. Liq. = Flammable liquid Muta. = Germ cell mutagenicity Resp. Sens. = Respiratory sensitisation Skin Corr. = Skin corrosion Skin Irrit. = Skin irritation Skin Sens. = Skin sensitisation STOT RE = Specific target organ toxicity-repeated exposure STOT SE = Specific target organ toxicity-single exposure
Revision date	8/10/2018
Revision	3

CHROMIUM HARD,TRIVALENT

Hazard statements in full	H302 Harmful if swallowed. H312 Harmful in contact with skin. H314 Causes severe skin burns and eye damage. H315 Causes skin irritation. H318 Causes serious eye damage. H319 Causes serious eye irritation. H332 Harmful if inhaled. H335 May cause respiratory irritation. H400 Very toxic to aquatic life. H402 Harmful to aquatic life.
NFPA - health hazard	Extremely hazardous, serious injury. (3)
NFPA - flammability hazard	Will not burn. (0)
NFPA - instability hazard	Normally stable. (0)

The Information in this data sheet is believed to be correct but neither we nor our employees or agents give any warranty or make any representation to the accuracy thereof and accept no liability for any loss, injury or damage which may result in it's use. The sole purpose of this data sheet is to provide guidance on the safe handling and use of the products to which it relates. It does not form part of any product specification nor part of any contract. It is not practical for the guidance and information in this data sheet to cover every conceivable application of a product and as we may not be aware of the use to which the products covered by this data sheet are to be put it remains the responsibility of the user to conduct it's own tests and to satisy itself as to the suitability of the product.

SAFETY DATA SHEET

Revision Date 01-Apr-2024 **Revision Number** 3

1. Identification

Product Name **Hexavalent Chromium, standard solution, Specpure®, Cr(+6) 1000µg/ml**

Cat No. : **42234**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757

Emergency Telephone Number
For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

Label Elements

Signal Word
Danger

Hazard Statements
May cause genetic defects
May cause cancer
May damage fertility or the unborn child



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Response
IF exposed or concerned: Get medical attention/advice
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	99.76
Ammonium bichromate	7789-09-5	0.24

4. First-aid measures

General Advice — If symptoms persist, call a physician.

Eye Contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact — Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation — Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion — Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects — None reasonably foreseeable.

Notes to Physician — Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media — Not combustible.

Unsuitable Extinguishing Media — No information available

Flash Point — No information available

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
None reasonably foreseeable.

Hazardous Combustion Products
Nitrogen oxides (NOx). Ammonia. Chromium oxide.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	-

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information. Do not allow material to contaminate ground water system. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Ammonium bichromate	TWA: 0.0002 mg/m³ STEL: 0.0005 mg/m³ Skin	(Vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³	IDLH: 15 mg/m³ TWA: 0.0002 mg/m³	TWA: 0.05 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard

EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Organic gases and vapours filter. Particulates filter conforming to EN 143.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	4 (1%)
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	23 hPa @ 20 °C
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	(NH4)2 Cr2 O7 in H2 O

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nitrogen oxides (NOx), Ammonia, Chromium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Ammonium bichromate	LD50 = 48 mg/kg (Rat)	LD50 = 1860 mg/kg (Rabbit)	LC50 = 0.2 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Ammonium bichromate	7789-09-5	Group 1	Known	A1	X	A1

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects California Proposition 65. Reproductive toxicity.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Ammonium bichromate	7789-09-5	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Ammonium bichromate	7789-09-5	Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Ammonium bichromate	7789-09-5	X	-	232-143-1	X	X	X	X	X	KE-01653

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting threasholds
Ammonium bichromate	7789-09-5	0.24	0.1 % 1.0 %	-

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ammonium bichromate	X	10 lb	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ammonium bichromate	X		-

OSHA - Occupational Safety and Health Administration — Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Ammonium bichromate	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Ammonium bichromate	10 lb	-	10 lb 4.54 kg

California Proposition 65 — This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Ammonium bichromate	7789-09-5	Carcinogen Developmental Female Reproductive Male Reproductive	-	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Ammonium bichromate	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security — This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade — No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Water	7732-18-5	-	-	-
Ammonium bichromate	7789-09-5	Carcinogenic Category 1B, Mutagenic Category 1B, Toxic for reproduction Category 1B Article 57 Application date: March 21, 2016 Sunset date: September 21, 2017 Exemption - None	Use restricted. See item 72. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 30. (see link for restriction details) Use restricted. See item 29. (see link for restriction details) Use restricted. See item 75. (see link for restriction details) Use restricted. See item 47. (see link for restriction details) Use restricted. See item 65. (see link for restriction details)	SVHC Candidate list - 232-143-1 - Carcinogenic, Article 57a;Mutagenic, Article 57b;Toxic for reproduction, Article 57c

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links
https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Ammonium bichromate	7789-09-5	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Ammonium bichromate	7789-09-5	Not applicable	Not applicable	Not applicable	Annex I - Y21

16. Other information

Prepared By
Health, Safety and Environmental Department
Email: chem.techinfo@thermofisher.com
www.thermofisher.com

Revision Date 01-Apr-2024
Print Date 01-Apr-2024
Revision Summary New emergency telephone response service provider.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 03-Feb-2010 **Revision Date** 24-Dec-2021 **Revision Number** 3

1. Identification

Product Name **Trichloroethylene**

Cat No. : **T340-4; T341-4; T341-20; T341-500; T403-4**

CAS No 79-01-6
Synonyms Trichloroethene (Stabilized/Technical/Electronic/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against .

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
Suspected of causing genetic defects
May cause cancer
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Trichloroethylene	79-01-6	>95

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	410 °C / 770 °F
Explosion Limits	
Upper	44.8 vol %
Lower	8 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Chlorine. Phosgene. Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen chloride gas.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
Environmental Precautions	Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers. Incompatible Materials. Strong oxidizing agents. Strong bases. Amines. Alkali metals. Metals. .

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m³ Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m³ TWA: 100 ppm	IDLH: 1000 ppm	TWA: 10 ppm STEL: 25 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-85 °C / -121 °F
Boiling Point/Range	87 °C / 188.6 °F
Flash Point	No information available
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)

Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	44.8 vol %
Lower	8 vol %
Vapor Pressure	77.3 mbar @ 20 °C
Vapor Density	4.5 (Air = 1.0)
Specific Gravity	1.460
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	410 °C / 770 °F
Decomposition Temperature	> 120°C
Viscosity	0.55 mPa.s (25°C)
Molecular Formula	C2 H Cl3
Molecular Weight	131.39

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Light sensitive.

Conditions to Avoid Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,

Hazardous Decomposition Products Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4920 mg/kg (Rat)	LD50 = 29000 mg/kg (Rabbit)	LC50 = 26 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Trichloroethylene	79-01-6	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mutagenic Effects Mutagenic effects have occurred in humans.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Heart spleen Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is:. Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata) EC50: = 450 mg/L, 96h (Desmodesmus subspicatus)	LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas) LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Trichloroethylene	2.4

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Trichloroethylene - 79-01-6	U228	-

14. Transport information

DOT

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1

Packing Group III

TDG

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IATA

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN1710
Proper Shipping Name TRICHLOROETHYLENE
Hazard Class 6.1
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Trichloroethylene	79-01-6	X	ACTIVE	R;S

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA 12(b) - Notices of Export

Component	CAS No	**TSCA 12(b)** - Notices of Export
Trichloroethylene	79-01-6	Section 5 Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Trichloroethylene	79-01-6	X	-	201-167-4	X	X	X	X	X	X

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Trichloroethylene	79-01-6	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Trichloroethylene	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors

Trichloroethylene	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Trichloroethylene	100 lb 1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Trichloroethylene	Carcinogenic Category 1B Article 57 Application date: October 21, 2014 Sunset date: April 21, 2016 Exemption - None	Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - 201-167-4 - Carcinogenic, Article 57a

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Trichloroethylene	79-01-6	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive	Seveso III Directive	Rotterdam	Basel Convention

		(2012/18/EC) - Qualifying Quantities for Major Accident Notification	(2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Convention (PIC)	(Hazardous Waste)
Trichloroethylene	79-01-6	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

APPENDIX C
HEAT/COLD STRESS PROTOCOLS

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.

3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.

4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. *Treatment for heat exhaustion*: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.

8. *Treatment of heat stroke*: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

TABLE 1

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2^{o}
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104^{o} or above
- Coma

TABLE 2

HEAT STRESS INDICATORS

Heat stress indicator	When to measure	If Exceeds…	Action
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F	Shorten next work period by 33% Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.

2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.

3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. *DO NOT* squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.

4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100^{o}F to 106^{o}F water bath. Water temperature will

drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

NOTE: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia*: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia*: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

TABLE 3[(1)]

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and imersion foot may occur				at any point on this chart							

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

CASTLETON
ENVIRONMENTAL

APPENDIX D
MEDICAL DATA SHEET

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

Medical Data Sheet
Name:
Date:
Phone:
Emergency contact:
Medical Conditions:
Allergies:
Current Medications:

APPENDIX E
GENERAL HEALTH AND SAFETY WORK PRACTICES

70 West Main Street, Babylon, NY 11702
631-482-1818 Office I 631-321-4349 Fax
www.castletonenv.com

CASTLETON
ENVIRONMENTAL

GENERAL HEALTH AND SAFETY WORK PRACTICES

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.

2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.

3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in actie work areas.

4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.

5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.

6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).

7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.

8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.

9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.

10. Personnel must follow Hot Work Permits as issued.

11. Personnel must use the Buddy System in the Exclusion Zone.

12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.

13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.

14. No person shall operate equipment unless trained and authorized.

15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.

16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.

17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.

18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.

19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.

20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.

21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.

22. Horseplay of any kind is prohibited.

23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.

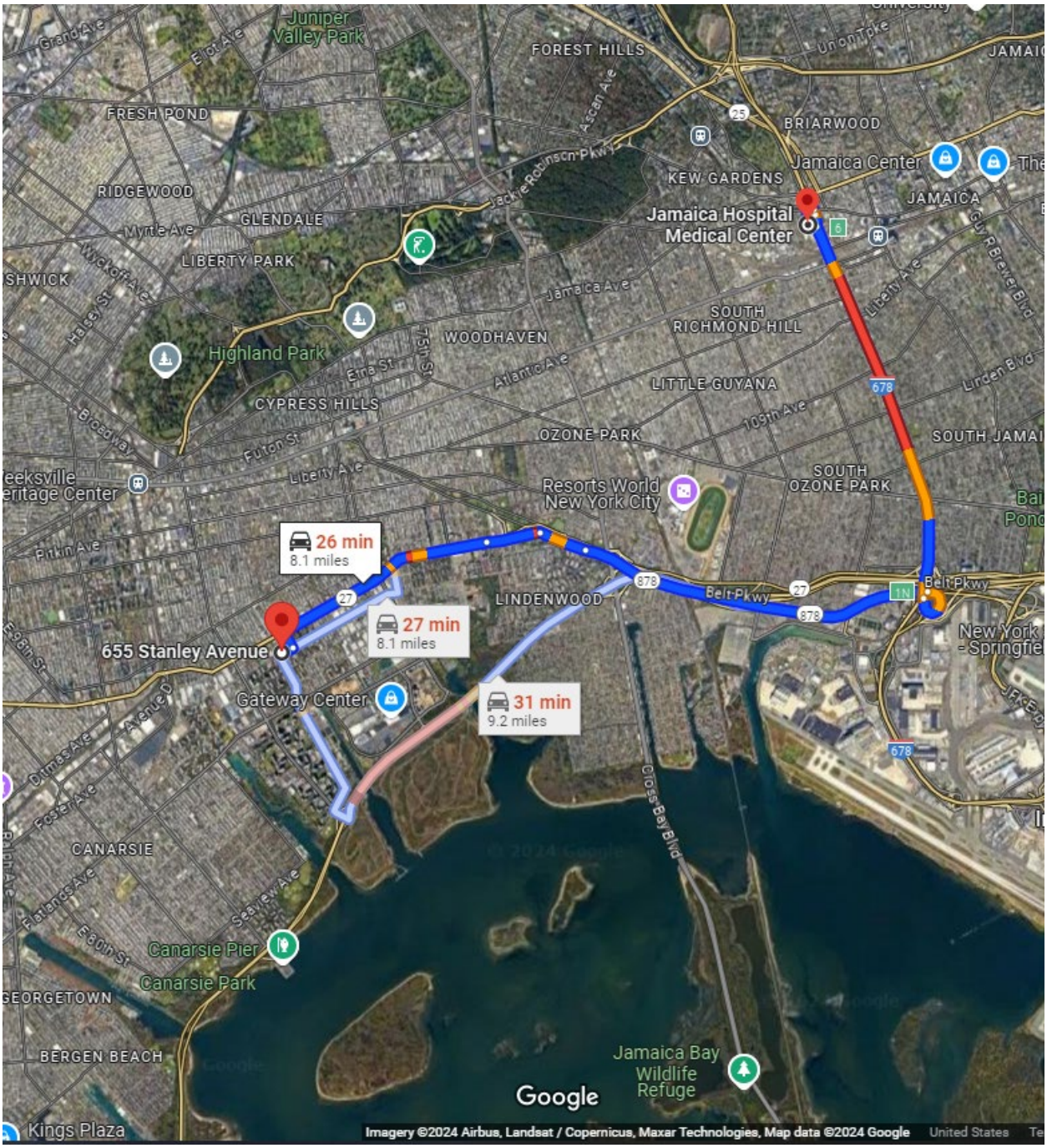
24. Incidents, no matter how minor, must be reported immediately to the Supervisor.

25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, Castleton Supervisors, and the FTL/HSO.

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APPENDIX F
HOSPITAL ROUTE MAP AND DIRECTIONS



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655 Stanley Ave
Brooklyn, NY 11207

- Take Linden Blvd and NY-878 E/Nassau Expy to I-678 N in Queens. Take exit 1N from NY-878 E/Nassau Expy

  15 min (5.2 mi)

- Follow I-678 N to Van Wyck Expy. Take exit 6 from I-678 N

  9 min (2.7 mi)

- Drive to Van Wyck Expy

  2 min (0.2 mi)

Jamaica Hospital Medical Ctr
8900 Van Wyck Expy, Richmond Hill, NY 11418

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APPENDIX G
INCIDENT REPORT FORM/INVESTIGATION FORM

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INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2

TYPE OF INCIDENT - CHECK ALL THAT APPLY

☐ INJURY/ILLNESS ☐ VEHICLE DAMAGE ☐ PROPERTY DAMAGE ☐ FIRE

☐ SPILL/RELEASE ☐ PERMIT EXCEEDENCE ☐ NEAR MISS ☐ OTHER

GENERAL INFORMATION

PROJECT NAME: DATE OF REPORT: REPORT NO.:

DATE OF INCIDENT: TIME: DAY OF WEEK:

LOCATION OF INCIDENT:

WEATHER CONDITIONS: ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A

DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)

AFFECTED EMPLOYEE INFORMATION

NAME: EMPLOYEE: ☐ YES ☐ NO

HOME ADDRESS:

SOCIAL SECURITY NO.: HOME PHONE NO.:

JOB CLASSIFICATION: YEARS IN JOB CLASSIFICATION:

HOURS WORKED ON SHIFT PRIOR TO INCIDENT: AGE:

DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO

INJURY/ILLNESS INFORMATION

NATURE OF INJURY OR ILLNESS:

OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM:

FIRST AID PROVIDED? ☐ YES ☐ NO

IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE

IF YES, WHO PROVIDED FIRST AID:

WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME

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INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO.
MEDICAL TREATMENT INFORMATION
WAS MEDICAL TREATMENT PROVIDED? ☐YES ☐NO
IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ON-SITE ☐DR.'S OFFICE ☐HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT:
ADDRESS WHERE TREATMENT WAS PROVIDED:
TYPE OF TREATMENT:
VEHICLE AND PROPERTY DAMAGE INFORMATION
VEHICLE/PROPERTY DAMAGED:
DESCRIPTION OF DAMAGE:
SPILL AND AIR EMISSIONS INFORMATION:
SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE:
ESTIMATED QUANTITY/DURATION:
CERCLA HAZARDOUS SUBSTANCE? ☐YES ☐NO
REPORTABLE TO AGENCY? ☐YES ☐NO SPECIFY:
WRITTEN REPORT: ☐YES ☐NO TIME FRAME:
RESPONSE ACTION TAKEN:
PERMIT EXCEEDENCE
TYPE OF PERMIT: PERMIT #:
DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF
PERMITTED LEVEL OR CRITERIA:
EXCEEDENCE LEVEL OR CRITERIA:
REPORTABLE TO AGENCY? ☐YES ☐NO SPECIFY:
WRITTEN REPORT: ☐YES ☐NO TIME FRAME:
RESPONSE ACTION TAKEN:
NOTIFICATIONS
NAMES OF PERSONNEL NOTIFIED: DATE/TIME:
CLIENT NOTIFIED: DATE/TIME:
AGENCY NOTIFIED: DATE/TIME:
CONTACT NAME:
PERSONS PREPARING REPORT
EMPLOYEE'S NAME:(PRINT) SIGN:

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SUPERVISOR'S NAME:(PRINT)		SIGN:	
INVESTIGATIVE REPORT			
DATE OF INCIDENT:		DATE OF REPORT:	REPORT
INCIDENT COST: ESTIMATED: $		ACTUAL: $	
OSHA RECORDABLE(S): ☐YES ☐NO # RESTRICTED DAYS		# DAYS AWAY FROM	
CAUSE ANALYSIS			
IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT?			
BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT?			
ACTION PLAN			
REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES			

ACTION	PERSON RESPONSIBL	TARGET DATE	COMPLETIO N DATE

PERSONS PERFORMING INVESTIGATION		
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:
MANAGEMENT REVIEW		
PROJECT MANAGER: (PRINT)	SIGN:	DATE:
COMMENTS:		
H&S MANAGER: (PRINT)	SIGN:	DATE:
COMMENTS:		

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EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

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APPENDIX H
DAILY BRIEFING SIGN-IN SHEET

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DAILY BRIEFING SIGN-IN SHEET

Date:_____

Project Name/Location: _____

Person Conducting Briefing:_____

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

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)

_____

_____

_____

3. ATTENDEES (Print Name):

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	36.
17.	37.
18.	38.
19.	39.
20.	40.

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APPENDIX E
COMMUNITY AIR MONITORING PROGRAM

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COMMUNITY AIR MONITORING PLAN
655-671 STANLEY AVENUE
BROOKLYN, NEW YORK

NYSDEC SITE NO. 224415
CASTLETON PROJECT NUMBER:ZDEZ2501

OCTOBER 2025

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2.2 Particulate Monitoring 2
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3.2 Dust Control 3
3.3 Nuisance Control 3

Appendices

Appendix A – NYSDOH Generic Community Air Monitoring Plan
Appendix B – New York State Department of Health Special Requirements for Work Within 20-Feet of Potentially Exposed Individuals or Structures

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1.0 INTRODUCTION

Castleton Environmental Geologic Services DPC (Castleton), has prepared this Community Air Monitoring Plan (CAMP) for the site located at 655-671 Stanley Avenue, Brooklyn, New York (the site). The site is listed on the New York State Department of Environmental Conservation's (NYSDEC) Environmental Site Remediation Database under site number 224415.

The proposed work is being performed on behalf of Unidos ZR LLC LLC, as part of their commitment to investigate under the Order on Consent.

This CAMP describes the methods to be used for the real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) within and at the downwind perimeter(s) of designated work areas (exclusion zones) when certain activities are in progress at contaminated sites.

The CAMP will follow the procedures outlined in New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan,* dated December 2009 (contained in DER-10/Technical Guidance for Site Investigation and Remediation, dated May 2010) and the Special Requirements for Work Within 20-Feet of Potentially Exposed Individuals or Structures, dated June 2000.

These documents are included in Appendix A and Appendix B, respectively.

2.0 COMMUNITY AIR MONITORING

Real-time continuous and periodic air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed during work activities as necessary. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings and monitoring wells. Periodic monitoring for VOCs will be performed as necessary during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells.

2.1 VOC Monitoring

The concentration of VOCs will be monitored at the downwind perimeter of the exclusion zone on a continuous basis during ground intrusive activities. Upwind concentrations shall be measured at the start of each workday, during changes in wind direction, and periodically thereafter to establish and maintain background conditions. The monitoring will be performed using a MiniRAE photoionization detector, capable of measuring VOC concentrations to the parts per million (ppm) level, calibrated daily to the manufacturer's specifications, and capable of calculating 15-minute running average concentrations.

The concentration of VOCs will be compared to the following parameters:

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- If the ambient air concentration of total VOCs at the downwind perimeter of the exclusion zone exceeds five-ppm above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases during instantaneous readings below five-ppm over background, work activities can resume with continued monitoring.
- If the total VOC concentration at the downwind perimeter of the exclusion zone persist at levels in excess of five-ppm over background but less than 25-ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities may resume provided that the total organic vapor level 200-feet downwind of the exclusion zone of half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20-feet), is below five-ppm over background for the 15-minute average.
- If the concentration of VOCs exceeds 25-ppm at the at the perimeter of the exclusion zone, work activities shall be shut down.
- All 15-minute readings must be recorded and available for State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, especially those use for decision making purposes, shall also be recorded.

2.2 Particulate Monitoring

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary monitoring stations. The monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

The concentration of particulates will be compared to the following parameters:

- If the downwind PM-10 particulate level is 100-micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150-ug/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, the downwind PM-10 particulate concentration is greater than 150-ug/m^3 above the upwind level, work will be stopped, and a re-evaluation of activities initiated. Work will resume, provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150-ug/m^3 of the upwind level and in preventing visible dust migration.

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- All readings shall be recorded and be made available for State (NYSDEC and NYSDOH) and County (Suffolk County Department of Health Services) Health personnel to review.

3.0 Odor, Dust, and Nuisance Control

3.1 Odor Control

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

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. Implementation of all odor controls, including halt of work, will be the responsibility of the representative's preparing the Completion Report.

3.2 Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. Implementation of dust controls, including halt of work, will be the responsibility of the representative's responsible for preparing the Remedial Closure Report.

3.3 Nuisance Control

Noise control will be exercised during the remedial program. Remedial work will conform, at a minimum, to local noise control standards.

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Appendix A

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Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

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Appendix B

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Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.