Norlite Environmental Sampling Report

New York State Department of Environmental Conservation

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NYSDEC

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1. Executive Summary

Norlite Corporation ("Norlite") has operated a lightweight aggregate plant in the City of Cohoes, NY since 1956. As part of its operations, Norlite receives waste, both hazardous and nonhazardous, for use as fuel in the facility's two (2) rotary kiln furnaces ("kilns"), which produce the lightweight aggregate. Norlite has received hazardous waste management permits from the New York State Department of Environmental Conservation (DEC) to conduct these operations in 1992, 2007, and 2016 as authorized by the U. S. Environmental Protection Agency.

In 2018, Norlite began to receive Per- and Polyfluoroalkyl Substances (PFAS) containing materials from the U.S. Department of Defense collection program, which included phased-out perfluorooctanesulfonic acid (PFOS) aqueous film forming foam (AFFF) for incineration in the facility's kilns. In 2019, DEC directed Norlite to cease all incineration of firefighting foam at the facility after the facility temporarily shut down its operations for planned facility upgrades. DEC provided the same direction in writing in June 2020.

In early 2020, community residents began raising concerns that kiln emissions from the facility may have caused PFAS contamination in the surrounding area. Since these compounds were not included in previously conducted emissions testing and human health and ecological risk assessments, DEC initiated an environmental sampling program to assess any potential impacts to the surrounding area.

Please note, this study was not conducted to determine compliance with applicable laws and regulations and does not preclude DEC from requiring additional investigation or monitoring to ensure compliance with applicable laws and regulations or from taking future enforcement action regarding the subject matter of this report. In addition, this study is specific to sampling for PFAS compounds and metals, and does not address concerns about the facility's non-compliance with fugitive dust emissions from its operations, which are the subject of an ongoing enforcement action.

DEC collected soil and water samples in October and November 2020, and analyzed these samples for the presence of PFAS compounds and metals. Soil samples were taken at locations considered most likely to be impacted from kiln emissions as determined by local meteorological information. Soil samples also were taken in locations near adjacent residential properties to assess the potential for human health exposure. Lastly, soil samples were taken from locations considered to be upwind from the kilns to assess concentrations unlikely to be impacted by kiln emissions.

In total, twenty-two (22) soil samples were collected from eighteen (18) locations. Surface water samples were collected from fourteen (14) locations. Four of the water sample locations were from the Salt Kill, which runs through the Norlite property, two from an on-site quarry pond, and two from an un-named pond immediately south of Norlite. Lastly, water samples from the Patroon Creek in Albany County, and Schuyler Creek in Saratoga County, were collected to assess background concentrations from other surface water sources. The samples from the stream locations were taken at both low and high flow conditions.

With regard to the soil samples collected, low level detections of PFAS compounds were present in all soil samples, which is consistent with background levels in emerging research and well below levels observed in areas impacted by industrial activity or prior releases of AFFF. This is discussed in more detail in Section 7.2 of this report. Although there are no soil cleanup objective concentrations for PFAS in regulation, DOH guidance values have been prepared for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). The guidance concentrations are based on the intended use of the property, and range from unrestricted, which envisions residential in addition to farming (assumes exposure through extensive soil contact, homegrown produce, and meat/dairy products), residential use, (exposure through extensive soil contact and homegrown produce), restricted residential (no exposure through food production, but still extensive soil contact), and commercial and industrial.[1]

The soil sample results for Saratoga Sites were all below residential use guidance values, and ranged from 0.29 parts per billion (ppb or µg/kg) and 0.63 ppb for PFOA and from 1.1 ppb and 4.5 ppb for PFOS. All of the soil samples collected showed PFAS concentrations lower than guidance values relevant to the residential areas surrounding Norlite, with the exception of one upwind soil sample south of Norlite (as shown on Figure 2 in the report) that had a concentration of 9.8 parts per billion (ppb or µg/kg). While this concentration exceeds the residential value of 8.8 ppb for PFOS, the resulting level is not indicative of a human health exposure risk because this sample location was not on residential property.

Analysis was also performed for metals concentrations in soils. The results for metals were compared to the 6 NYCRR Subpart 375-6 Soil Cleanup Objectives. Like the PFOA and PFOS guidance values, these values are derived to be protective of human health, based on the use of the property. As with PFOS, only one sample result exceeded a residential use value currently in the Subpart 375-6 regulation. This sample was taken to the east-southeast of Norlite, and contained mercury at 1.6 parts per million (ppm or mg/kg), which is higher than the residential soil cleanup objective of 0.81 ppm. This sample was collected from a non-residential setting in the road right of way adjacent to a former landfill operated by the Bendix Corporation, and poses a minimal health risk because the location is not being used for residential purposes, and exposures associated with residential land use are not likely to occur there.

The results of the analysis for the water samples collected also indicated the presence of PFAS at low concentrations. However, none of these concentrations are indicative of a concentrated source area impact and there is some variability in these concentrations. In general, the concentrations found in the Salt Kill were lower than those found in the Patroon Creek and higher than those found in Schuyler Creek. Of the samples taken from flowing waters, one sample from Patroon Creek exceeded New York State's drinking water Maximum Contaminant Level (MCL) for PFOS. The Patroon Creek is not used as a drinking water source. Concentrations of PFOS were found in the on-site quarry pond at 12 parts per trillion (ppt or ng/l). This concentration level was not found in the adjacent Salt Kill. Low concentrations of

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1 https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1

PFAS compounds in addition to PFOA or PFOS were also found in all samples. DEC guidance requires a screen for total PFAS compounds in water at concentrations greater than 500 ppt. None of the water samples exceeded this value.

Samples obtained from the pond immediately to the south of the Norlite facility had concentrations of one PFAS, Perfluorobutanesulfonic acid (PFBS), at 100 ppt. This concentration is greater than the values found in other nearby water samples. Analysis of the PFBS concentrations and the overall PFAS pattern detected indicates that it is not likely that this concentration is related to Norlite operations. The pond is not used as a source of drinking water and does not represent a risk of exposure to area residents.

Results of the comparison of water samples taken at high flow conditions versus low flow conditions varied between locations. In areas thought to be less impacted by possible PFAS emissions from Norlite or other industrial sources, there was a slight increase in total PFAS concentrations during high flow samples as compared to the low flow samples even though all values were at low concentrations. In other locations, including the Salt Kill sample farthest downstream and Patroon Creek samples 2 through 4, the low flow samples had higher concentrations than at high flow. Overall, this indicates that there may be some impact on these concentrations from stormwater runoff, although other sources may be contributing to the values in Patroon Creek and at Salt Kill sample 4 locations.

DEC also used analysis of measured PFAS and metals concentrations in soils to evaluate the influence of wind direction relative to these sample locations. The full data set for all the individual PFAS compounds were analyzed in the upwind and downwind samples. There is no clear evidence of an upwind and downwind gradient of individual or total PFAS, which would be expected if the PFAS combusted at Norlite was not destroyed by the high temperatures of the kilns. Metals concentrations were also analyzed for distribution due to potential air deposition. Overall, except for arsenic, mercury, copper, and lead, downwind concentrations are lower than or comparable to upwind metal concentrations. Elevated concentrations of mercury, copper and lead were found in downwind sample S10. The results from this sample location, which was in close proximity to a closed industrial landfill, indicates there is the potential that the past operations at the landfill may skew the downwind concentrations higher. When the results from this sample location are removed from the analysis, DEC did not observe any notable upwind/downwind gradient of soil metal concentrations.

Based on the comprehensive review of the data undertaken by DEC experts in consultation with the New York State Department of Health (DOH), the conclusions of this report are as follows:

- Analysis of soil concentrations does not show clear evidence of an increase in downwind PFAS concentrations;
- Analysis of soil concentrations does not show evidence of a significant increase in downwind metals concentrations;
- Concentrations of PFOA and PFOS in soils do not indicate a human health risk. These concentrations are below levels developed by DOH applicable to the current land use and potential for human exposure;
- Analysis of stream water concentrations at high flow and low flow indicates possible influence from soils and precipitation in areas of low surface water PFAS concentrations, but not in locations with higher surface water concentrations, such as those found in the Patroon Creek and in the Salt Kill downstream from Norlite; and
- Analysis of surface water samples in areas of ponded water on or near Norlite property indicate that there are likely sources of PFAS compounds not associated with Norlite kiln emissions.

As a result of this study and its findings:

- DEC and DOH will continue to evaluate health-based values for all PFASs and work to establish guidance values for additional PFASs;
- DEC will monitor groundwater and surface water on Norlite property to better assess existence of PFASs over time;
- DEC will require emissions testing to include analysis of organic and inorganic fluorine compounds from the kilns at Norlite; and
- DEC will further assess potential sources of contamination observed in this report.

Norlite Environmental Sampling Report

2. Introduction – Project Area

Sampling was conducted at the Norlite Corporation facility in Cohoes and at off-site locations by New York State Department of Environmental Conservation (DEC) staff from the Divisions of Environmental Remediation (DER) and Materials Management (DMM) in coordination with the Division of Air Resources (DAR), see Figure 1. Sampling was conducted by DEC to characterize the occurrence of per- and polyfluoroalkyl substances (PFAS) and metals, if any, in soil and surface water. This document presents the sampling results from the onsite and off-site as well as background locations.

2.1 Background

The Norlite facility is an expanded shale aggregate plant and active shale quarry, which has been operating since 1956. Norlite uses waste, both hazardous and nonhazardous, as fuel in the facility's two rotary kiln furnaces. These furnaces heat the shale being mined onsite to create lightweight aggregate. Norlite holds multiple DEC permits to conduct these operations. As a part of the current air discharge and hazardous waste permitting renewal processes, DEC has required emissions testing, and a multi-pathway human health and ecological risk assessment be conducted. These assessments and testing do not include a PFAS emissions assessment based on prior community requests.

As part of its operations, Norlite receives spent solvents and other hazardous and non-hazardous material wastes for use as fuel in firing the kilns to make aggregate. In 2018, Norlite began receiving PFAS-containing aqueous film forming foam (AFFF), which was combusted in the kilns. This practice ended in late 2019 as directed by DEC.

In March 2020, Bennington College conducted limited water and soil sampling in the vicinity of the facility to assess the possible migration of PFAS contamination. Recent sampling coordinated by DEC and DOH (May 2020)at the nearest public water supplies (Cohoes, Green Island) did not find evidence of PFAS contamination stemming from Norlite's activities. However, area residents and public officials are still concerned that the combustion of PFAS-containing materials has led to PFAS contamination off-site and urged DEC to conduct more rigorous sampling to evaluate the possibility of PFAS contamination in the local area. To address the public's overall concern about the combustion of PFAS containing materials at the Norlite facility, DEC conducted a PFAS and metals sampling program. Soil and surface water samples were collected at the Norlite facility, on the grounds of the adjacent Cohoes Housing Authority (CHA) Saratoga Site Apartments, and other off-site areas.

2.2 Site/Sample Location Descriptions

Samples were obtained from within the Norlite facility, within the CHA Saratoga Sites Apartment complex, Patroon Creek, Schuyler Creek, Salt Kill and various off-site locations. See Figure 1.

Norlite:
The Norlite facility, located within the Town of Colonie and City of Cohoes, is in a mixed land use area near residential and commercial properties. Residences are located to the north, east, and south. Commercial areas are located to the east and south. Undeveloped land exists west and north of the site. The site is located on the north side of State Route 7 (locally known as Alternate Route 7), and west of Route 32.

The facility, consists of approximately two hundred-twenty (220) acres, including an active shale mine, site operations area, and undeveloped buffer parcels along some of the site boundaries. Approximately forty (40) acres of the site are developed and include office buildings, shale aggregate processing facilities, rotary kilns, fuel receiving, storage and processing areas, aggregate storage piles and other operations buildings.

CHA Saratoga Sites Apartments:
The Cohoes Housing Authority (CHA) Saratoga Sites Apartments are located in the City of Cohoes in a mixed-use area with residential, commercial, and industrial properties. The apartments are bound to the west by train tracks and then the Norlite facility, to the north by the Norlite access road, to the east by Cohoes Road (Route 32), followed by residential and commercial properties, and to the south by a wooded area. The complex is composed of thirteen buildings, an ashpalt basketball court, paved walkways, and a playground.

Patroon Creek, various locations, Albany, NY:
Patroon Creek flows east-southeast from the Six-Mile Reservoir in the Albany Pine Bush Preserve to the Hudson River. The creek flows through the city of Albany both above and below ground. There were four surface water sample locations along Patroon Creek: Six-Mile Reservoir, an Albany Water Authority right of way, Tivoli Lake Wildlife Park, and the confluence with the Hudson River.

Schyler Creek, various locations, Saratoga County, NY:
Schuyler Creek flows east-southeast from north of Route 243 to the Hudson River in the Town of Stillwater. The creek flows through forested agriculture fields, residential properties, and the Town of Stillwater. The creek was sampled at its intersection with Filke Road and the downstream side of the bridge on Hudson Street.

Salt Kill, Albany County, NY:
The Salt Kill flows east-southest through the Norlite facility and is a tributary of the Hudson River. The off-site surface water sample at Salt Kill was collected at the downstream side of the intersection with Johnson Road. Sampleswere also collected from just upstream from where the Salt Kill enters Norlite property, on Norlite property within operations areas, and just

downstream from Norlite but prior to the stream becoming influenced by the receiving waterbody.

Off-site soil samples, various locations, Albany County, NY:
Soil samples were collected on public rights-of-way throughout Albany County. The sample locations were selected as they are located in upwind and downwind locations in relation to the Norlite facility and were expected to show what impacts the emissions are having on off-site soil. Samples were collected east of the Norlite facility along I-787, Tibbits Avenue, Green Island near the intersection with I-787, at the Alexander Street Trail Head, along Kirkner Avenue, Crabapple Lane, Hilltop Drive, and Boght Road.

The general sampling areas are illustrated on Figure 1.

3. Project Objectives

The project objectives as stated in the sampling program workplan:

- Design a sampling program of environmental media in the vicinity of the Norlite Plant in Cohoes, NY to determine the possibility of surface soil and surface water contamination resulting from the receipt and incineration of PFAS containing materials including AFFF.
- Obtain site specific background PFAS concentrations in these environmental media.
- Soil samples will be analyzed for metals to evaluate these contaminants in soils surrounding the Norlite facility.
- These results will be compared with guidance values listed in *Guidance for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs January 2021* (NYSDEC PFAS Guidance), Title 6 of the New York Codes, Rules and Regulations (6NYCRR) Subpart 375-6 Remedial Program Soil Cleanup Objectives and with other relevant guidance.

4. Task Description

Field activities included the collection of forty-eight (48) soil samples and twenty-seven (27) surface water samples from thirty-two locations for PFAS, metals, and Total Oxidizable Precursor (TOP) assay. A list of the sample locations and analyses is presented in Table 1. Soil samples were collected from the top six inches to represent surface soil conditions. Soil sampling occurred on the Norlite facility, CHA Saratoga Apartment Sites, along Patroon Creek in Albany, NY, and within public right of ways in Albany County. Additional soil samples were collected from the top two inches from the CHA Saratoga Sites Apartments to represent possible public health exposure. Surface water samples were collected over two days to assess both high and low flow conditions. High flow conditions show contributions from stormwater runoff and precipitation in the watershed and low flow conditions indicate concentrations without contributions from stormwater runoff. Each sample location was recorded using a calibrated GPS Trimble in degrees of latitude and longitude.

4.1 Soil Sampling

Soil samples were collected on October 21, 2020, targeting areas with the highest potential of kiln emissions impact and sensitive receptors. Five (5) samples were collected on Norlite property. Thirteen (13) background samples were collected for comparison. Thirteen samples (13) were collected for quality control and quality assurance.

In accordance with the October 2020 Norlite sampling workplan and the NYSDEC PFAS Guidance, soil samples were collected both on and off-site. DER and DMM staff collected grab samples by digging soil with a stainless-steel spoon, excluding ground cover and organic matter (e.g., roots, sticks, leaves), then using the spoon to mix soil in a stainless-steel bowl until homogenized. The soil was then packed into the laboratory provided container. Soil collection equipment was decontaminated between samples with Alconox and certified PFAS-free tap water. Staff utilized proper personal protective equipment (PPE) (i.e., level D - nitrile gloves, non-PFAS containing clothing) while sampling. The soil sample name, location (latitude/longitude), collection depth, color, description, and analysis to be performed were recorded on a sampling field log (Appendix A). Total Oxidizable Precursor (TOP) assay samples were collected from 0-2 inches to evaluate degradation products individuals may be exposed to. The TOP assay was developed to indirectly quantify the concentration of perfluoroalkyl acid (PFAA) precursors, i.e., PFASs, that may degrade in the environment to other products such as perfluoroalkyl carboxylic (PFCAs).[2] These samples were taken from residential properties. Additional grab samples were collected from 0-6 inches to assess air deposition and the downward migration of PFAS over time. The 0-6 inch samples were collected at all soil sampling locations.

4.2 Surface Water Sampling

Surface water samples were collected during both high and low flow conditions from a total of fourteen (14) locations. High flow conditions occur within 24 hours of a rainfall event that produces at least a quarter inch of rain. Low flow conditions occur after at least 72 hours of no precipitation. High flow surface water samples were collected on October 30, 2020 following a significant precipitation event, in which greater than one inch of rain fell (Appendix C). Low flow surface water samples were collected on November 6, 2020. Precipitation did not occur within 72 hours prior to the sampling event.

Sampling methods remained consistent for both high and low flow conditions. A decontaminated stainless-steel sampling bucket (see photos in Appendix B) was rinsed three times with the site water to be collected. The sample was then collected from the surface water air interface and poured directly into the sample container. When filling multiple sampling containers, more than one scoop was needed to fill all the containers. Immediately after

[2] Houtz EF; Sedlak DL Oxidative Conversion as a Means of Detecting Precursors to Perfluoroalkyl Acids in Urban Runoff. Environ. Sci. Technol 2012, 46, 9342–9349.

collection, the samples were placed in iced coolers to keep the samples at 4± 2º Celsius until laboratory analysis could be performed.

4.3 Field Procedures, Analytical Methods, and Quality Assurance

Hazardous Waste Operations and Emergency Response-certified field staff collected water and soil samples using the grab sampling technique as described in this document. PFAS samples were stored in laboratory-provided, clean, high-density polyethylene containers. Metal samples were stored in clean glass containers proved by the laboratory. Field staff practiced proper sample packaging methods and chain of custody procedures as well as the shipment of samples to the contract laboratory.

Quality control (QC) sampling included matrix spike (MS) and matrix spike duplicates (MSD) and trip blanks. MS and MSD samples were collected at a frequency of one per twenty samples and analyzed for the same analytes as the environmental samples per sampling event. The laboratory provided trip blanks with each shipment of sample water sampling containers. Trip blanks were analyzed for PFAS only. At the end of each sampling day, one equipment blank was collected after all sampling activates were completed and the sampling equipment was decontaminated. PFAS-free water supplied by the laboratory was poured into the clean sampler/stainless-steel bowl and then placed into a container for analysis.

All samples were submitted to Eurofins TestAmerica, a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory, for analysis. Eurofins TestAmerica performed the analysis in accordance with the latest edition of the NYSDEC Analytical Services Protocol and provided 6 NYSDEC Category B laboratory deliverables packages. EPA Method 537 (modified) was used to analyze surface water and soil samples for PFAS. Additionally, soil samples were analyzed for metals per EPA Methods 6010D (various analytes), 7471B (mercury) and 7196A (hexavalent chromium). Two soil locations and two surface water locations were analyzed using TOP assay.

5. Analytical Results

The following section provides a summary of the soil and surface water data generated during the site investigation. Data summary tables generated during the site investigation are provided in Tables 2 through 6. Compounds exceeding applicable or established NYSDEC standards and guidance values for soil and surface water are summarized on Figures 2 through 7. Analytical reports are provided in Appendix E.

5.1 Soil

A total of forty-eight (48) soil samples including four (4) field duplicates were collected from eighteen (18) soil sample locations and submitted for laboratory analysis. All metals analytical soil data were compared to the 6NYCRR Subpart 375-6 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Residential Soil Cleanup Objectives (RSCOs). All PFAS analytical soil data were assessed using guidance values for unrestricted use and residential use provided in NYSDEC PFAS Guidance, January 2021. This guidance currently presents Unrestricted Use

Guidance Values (UUGVs) and Residential Use Guidance Values (RUGVs) among other restrictive use values. Laboratory analytical data generated during the investigation for soil is summarized in Table 2 through Table 4. Soil sample locations and exceedances of guidance values, UUSSCOs and RSCOs are shown on Figure 2 through Figure 4.

A summary of soil sampling results is provided in the following sections.

5.1.1 PFAS

All samples were analyzed for PFAS compounds using Method 537 (modified) and two soil locations were additionally analyzed using TOP Assay. Currently there are two compounds with guidance values (GV) established for PFAS in soil. Perfluorooctanesulfonic acid (PFOS) has an unrestricted use guidance value (UUGV) of 0.88 parts per billion (ppb) and residential use guidance value (RUGV) of 8.8 ppb. Perfluorooctanoic acid (PFOA) has an UUGV of 0.66 ppb and RUGV of 6.6 ppb.

- PFOA and PFOS were detected in 23 of 24 soil samples collected and was distributed throughout the soil sampling locations.
- PFOA exceedances of the UUGV were detected in seven samples and no exceedance of the RUGV was detected in the samples. Sample concentrations ranged from non-detect to 1.1 ppb.
- PFOS exceedances of the UUGV were detected in 16 samples and an exceedance of the RUGV in one sample collected at the Soil 14 location. Sample concentrations ranged from non-detect to 9.8 ppb.

5.1.2 Total Oxidizable Precursor (TOP) Assay

Two soil samples, an upwind and a downwind sample (S15 and S8B) were analyzed using the TOP Assay. The TOP Assay will identify if there is a significant PFAS mass in the samples that the conventional method of analysis does not capture and provides additional information regarding the scale of potential PFAS contamination. It will transform sulfonamido and fluorotelomer precursors which cannot be detected using traditional methods into perfluoroalkyl carboxylates, which are referred to as terminal end products, which means they persist in the environment indefinitely.

The soil samples were analyzed to evaluate how much oxidizable PFAS could be liberated into the environment. In the upwind sample (S15) the post TOP Assay results indicated there was minimal formation ofterminal end products, the difference between the pre- and post-sample was 0.1 ppb total perfluoroalkyl carboxylates indicating no real presence of precursors in this sample. The downwind sample (S8B) contained minimal precursors, the difference between the pre- and post-sample was 2.3 ppb total and the increase was primarily in the short-chain PFBA. This result indicates there were some short-chain precursors detected in this sample which oxidized to PFBA. Overall, the results of the TOP Assay on these soil samples indicated there are minimal perfluoroalkyl precursors in these two soil samples.

5.1.3 Metals

A total of twenty (20) samples and two (2) field-duplicates were analyzed for twenty-two (22) metals via method 6010D. The samples were analyzed for mercury using method 7471B

- Detections of aluminum, arsenic, barium, beryllium, calcium, Total chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, vanadium and zinc were found in all samples.
- Detection of cadmium was detected in 86% of samples, sodium was detected in 45% of samples, thallium was detected in 32% of samples and selenium 18% of samples.
- Metal exceedances of the UUSCO were detected in nine samples.
- Lead, nickel and zinc accounted for the highest percentage of metal samples exceeding the UUSCOs at 14%, 18% and 36%, respectively. The highest concentrations of exceedances for each of these metals were within an order of magnitude of their UUSCO value.
- Copper exceeded its UUSCO once in twenty-two (22) samples, at a concentration of 90.7 ppm.
- Mercury exceeded its UUSCO only at the Soil 10 location, with a concentration of 1.6 ppm.
- Iron was detected in all soil samples. There are no regulatory values for iron established in 6NYCRR Part 375, but the concentrations found were greater than the guidance value found in DEC's Commissioner's Policy 51.

5.2 Water

A total of twenty (27) samples were collected from fourteen (14) surface water locations and submitted for laboratory analysis for PFAS compounds. All analytical water data were assessed using NYSDEC PFAS Guidance, October 2020.

Per the guidance document, guidance values for PFOA or PFOS concentrations in groundwater or surface water are assessed against a guidance value at or above 10 parts per trillion (ppt or ng/L). In addition, any other individual PFAS (not PFOA or PFOS) is assessed against a guidance value at or above 100 ppt; and the total concentration of PFAS (including PFOA and PFOS) in a single sample is assessed at a guidance value at or above 500 ppt. Laboratory analytical data generated during the investigation for water is summarized in Tables 5 and 6.

All water samples were analyzed for PFAS compounds using Method 537 (modified) and two water samples were additionally analyzed using TOP Assay. Laboratory analytical data generated during the investigation for surface water quality is summarized in Table 5 and Table 6. Surface water sample locations and exceedances of guidance values are shown on Figure 5 through Figure 7.

A summary of water quality results is provided in the following sections.

5.2.1 PFAS

All samples were analyzed for PFAS compounds using Method 537 (modified) and two (2) soil locations were additionally analyzed using TOP Assay. The guidance document presents guidance values for 21 PFAS compounds and total PFAS in a sample. Currently the values for PFOA or PFOS concentrations in groundwater or surface water are compared to the New York State maximum contaminant level of 10 parts per trillion (ppt), which is being used as a guidance value although the MCL does not apply to these water resources as they are not being used for drinking water. As stated above, the nearest public drinking water supplies (Cohoes, Green Island) were assessed in a previous sampling effort (May 2020) and found to not be impacted. For the current analysis,any other individual PFAS (not PFOA or PFOS) is assessed against a guidance value at or above 100 ppt; and the total concentration of PFAS (including PFOA and PFOS) in single sample is assessed at a guidance value at or above 500 ppt. A summary of the PFAS analysis follows and all data is presented in Table 5.

- PFOA and PFOS were detected in all water samples at all locations.
- PFOS exceeded the guidance value of 10 ppt at three locations: Water 5, Water 6 and Water PC2 during low flow sampling, with a maximum concentration of 21 ppt.
- All PFOA detections were below the guidance value of 10 ppt.
- Perfluorobutanesulfonic acid (PFBS) was detected at the guidance value of 100 ppt at two surface water locations: Water 7 and Water 8.
- All other individual PFAS (not PFOA or PFOS) compounds were below the guidance value of 100 ppt.
- No samples exceeded the total PFAS guidance value of 500 ppt.
- No exceedances were detected for any PFAS guidance value during high flow sampling.

5.2.2 Analysis of Water Samples Using the Total Oxidizable Precursor (TOP) Assay

Two (2) water samples (W4 and W7) were analyzed using the TOP Assay. In the W4 sample there was a minimal formation of terminal end products the difference between the pre- and post-sample was only 10 (ppt) and the increase was primarily in the short chain PFBA.

In the W7 sample there was minimal formation ofterminal end products. The difference between the pre- and post-samples was 27 ppt and the increase was primarily in the short chain PFBA. The slight increase of perfluoroalkyl precursors in this water sample versus W4 indicates some short chain perfluoroalkyl precursors were present to a greater degree in the W7 sample. Overall, the results of the TOP Assay on these water samples indicated a minimal increase in perfluoroalkyl precursors in these two water samples which indicates a minimum amount of precursors were in the water samples.

This data is presented in Table 6.

6. Data Usability

DEC chemists conducted data reviews on all samples submitted for analysis. Data usability summary reports (DUSR) were created and are provided in Appendix E. The data review summarizes analytical protocol compliance or deviation, and quality control. Two water samples required a qualifier adjustment (low flow samples 4 and 7) due to Extracted Internal Standards (Isotope Dilution Analytes) criteria not being met; no other water samples required qualifiers. For soil samples analyzed for PFAS, criteria for blanks, MS/MSD, and lab control spike were not met for fourteen, one, and four samples, respectively which required a qualifier adjustment for each. Soil samples S13-SOIL-102120 and S9B-SOIL-102120 analyzed for metals are unusable for hexavalent chromium as the matrix spike was below control limits. Additionally, hexavalent chromium in water blank samples exceeded holding times and were therefore determined to be unusable.

7. Discussion

7.1 Soil Concentrations Compared to Applicable Standards

No regulatory value of PFOA or PFOS has yet been established by the State for concentrations of PFAS compounds in soil. However, guidance values derived to be protective of human health have been established for PFOA and PFOS as follows for different land uses. The NYS guidance values in this chart are lower (more stringent) than residential soil targets in any other state reporting such criteria (See Interstate Technology Regulatory Council 2021 PFAS Fact Sheets https://pfas-1.itrcweb.org/fact-sheets/).

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater	1.1	3.7

UUGV values are protective for an intensive residential/farm soil use scenario where contact with soil contaminants is possible via three pathways: direct contact/ingestion, the consumption of homegrown fruit/vegetables and the consumption of homeraised meat/dairy products. RUGVs are for a residential non-farm scenario which excludes the consumption of homeraised meat/dairy products. Restricted Residential Use Guidance Values (RRUGVs) are residential-based targets where no homegrown products of any type are consumed but there remains direct soil contact and ingestion. Relative to Saratoga Sites and other residential areas that surround Norlite the RUGV and RRUGV scenarios are most consistent with the current land use, the corresponding soil GVs being 6.6 to 33 ppb for PFOA and 8.8 to 44 ppb for PFOS. In all cases, both upwind and downwind, PFOA concentrations are below the RUGV targets for PFOA, which is also true for PFOS except for one location which is slightly above the RUGV. The one location exceeding the RUGV for PFOS was at location 14. The value of 9.8 ppb at this location is greater than the RUGV of 8.8 ppb, but below the RRUGV of 44 ppb. Location 14 is in a location expected to be predominantly upwind from Norlite and was taken from a non-residential area. PFOS soil levels in that area (locations 13-15) varied between 1.1 and 9.8 ppb while locations further south along the Patroon Creek and Interstate 90 in Albany ranged from 1.3 to 6 ppb PFOS. These upwind results show the variable nature of PFOS soil data in the general area. Overall, the soil results indicate no exceedances of restricted residential guidance values and one slight exceedance of the RUGVs (PFOS at 9.8 ppb, upwind location, non-residential location). Thus, the PFAS levels detected in soil in this study do not represent a public health concern.

It should be noted that soil sample locations 6, 7, 8, and 9 were within CHA property at the Saratoga Sites Apartments. For apartment complexes such as this where homegrown food production opportunities are limited or do not exist, the use guidance value with which to compare results is restricted residential. Results from these locations were all less than one tenth of the restricted residential use guidance value for PFOA and PFOS when looking at the 0-2 inch sample depth. The 0-2 inch depth is preferred to determine potential exposures for residents as it represents the most likely soil depth for human contact. All of the Saratoga Sites soil PFOA and PFOS results were also below the RUGV values.

For metals, the results were compared to the 6 NYCRR Subpart 375-6 Soil Cleanup Objectives (SCOs). Like the PFOA and PFOS soil guidance values, these are also derived to be protective of human health and are based on the use of the property. With the exception of the mercury at location 10, all of these results are below residential standards. The residential SCO for mercury is 0.81 ppm.

Soil sample location 10 is located along Tibbets Avenue and was taken on the public right of way, but as far away from the road as possible along a fenceline for the adjacent property. Photos of all sample locations are shown in Appendix B. The adjacent property is the location of the former Bendix landfill. While the mercury concentration exceeds the residential SCO, residental land use involving regular direct contact with and ingestion of soil as well as raising vegetables does not occur at this location making any possible health risk minimal from mercury at location 10. As a point of reference, the soil cleanup objective for mercury that has the most relevance to location 10 is the industrial SCO which is 5.7 ppm.

In summary, none of the samples taken in this study indicate soil concentrations of PFAS compounds or metals that exceed the established standards or guidance values for current and anticipated use of the property.

7.2 Detection Frequency and Concentration of PFAS in Soils

Table 7.2 provides the range of individual PFAS detected in the soil studies conducted in the northeast in comparison to the samples collected around Norlite. These studies were conducted to examine the soil concentrations of PFAS in areas which were not directly impacted by known sources of PFAS emissions. In general, soil that has been contaminated by industrial emissions or the application of PFAS containing bio-solids have soil concentrations of total Perfluoroalkyl Carboxylates (PFCAs) and Perfluorosulfonic Acids (PFSAs) in excess of 100 ppb.[3] None of the soil samples collected in this study had total PFCA and PFSA concentrations which exceeded this value. Since soil contamination of PFAS is so widespread a recent study attempted to delineate background concentrations of PFOS and PFOA from areas of known contamination.[4] The median PFOS and PFOA concentrations for background areas was 2.7 ppb. In comparison, the median values for PFOS and PFOA in the soil samples collected around Norlite were 1.2 and 0.58 ppb. These extensive studies on soil concentrations indicate there has not been any gross soil PFOA and PFOS contamination detected in the area around Norlite as result of the high temperature incineration of AFFF or other PFAS containing fuels.

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[3] Rankin K, Mabury SA, Jenkins TM, Washington JW (2016). A North American and Global Survey of Perfluoroalkyl Substances in Surface Soils: Distribution Pattern and Mode of Occurrence. Chemosphere 161: 333 – 341

[4] Brusseau ML, Anderson RH, Guo B. 2020. PFAS concentrations in soils: Background levels versus contaminated sites. Science of the Total Environment. 740. 140017. Available On-Line: PFAS concentrations in soils: Background levels versus contaminated sites - ScienceDirect

Table 7.2 – Range of PFAS Detected in Soil Studies from the Northeast (ug/kg or ppb)[5,6]

Analyte	Vermont Range[1]	Norlite Range[2]	Catskills/Adirondack Range[3]
PFBA	N/A	0.1 – 0.9	
PFPeA	0.14 – 1.3	ND – 1.6	
PFHxA	0.05 – 4.4	0.12 – 1.1	ND - 0.32
PFHpA	0.044 – 0.9	0.063 – 1.0	ND – 0.41
PFOA	0.052 – 4.9	0.19 – 1.1	0.26 – 1.1
PFNA	0.051 – 5.0	0.16 - 2.4	ND - 0.45
PFDA	0.043 – 7.6	0.073 – 2.1	
PFUnA	0.038 – 2.6	0.12 – 1.8	ND – 0.34
PFDoA	0.10 – 0.69	ND - 0.35	ND
PFTriA	N/A - 0.13	ND - 0.26	
PFTeA	N/A	ND – 0.13	
PFBS	0.033 – 1.6	0.044 – 0.25	
PFHxS	0.076 – 0.88	ND - 1.5	
PFOS	0.106 – 9.7	0.26 – 9.8	ND – 1.4
PFDS	0.032 – 0.92	ND - 5.7	
NetFOSSA	[4]	ND – 1.5	
6:2 FTS	[4]	ND – 0.23	
8:2 FTS	[4]	ND – 0.70	

N/A – not applicable due to limited quantitative detection.
ND – not detected.
1 – Analysis performed for 17 PFAS (66 soil samples collected)
2 - Analysis performed for 21 PFAS (16 soil samples collected)
3 – Analysis performed for 14 PFAS (6 soil samples collected)
4 – . Not included in laboratory analysis.

The qualitative and quantitative detection frequency of each PFAS, minimum and maximum concentration of quantitative detections at the 18 locations sampled at the 0 – 6” depth is displayed in Appendix D. Qualitative values are estimated concentrations which were detected and flagged in the laboratory analysis. Quantitative values are concentrations which are not flagged by the laboratory and are considered to be accurate. As estimated values, qualitative detections were not included in the ranges presented in Appendix D but are noted in the qualitative frequency column.

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[5] Zhu,W, Roakes H, Zemba, SG, Badireddy AR. 2019. PFAS Background in Vermont Shallow Soils. University of Vermont. Available On-Line: Microsoft Word - PFAS FINAL REPORT_03-24-19.docx (vt.gov).

[6] Schroeder T, Bond D, Foley J. 2019. Report of PFAS Soil Sampling on NY-DEC Lands by the Bennington College “Understanding PFOA Project”. Available Upon Request.

Several PFAS were quantitively detected at relatively high frequencies in the soil samples upwind and downwind from Norlite. PFOA, PFNA and PFDA were quantitatively found in 50% or more of the samples collected. PFBA, PFHxA, PFUnA and PFOS were found quantitatively in 20 to < 50% of the samples collected. PFPeA, PFHpA and PFDOA were found quantitatively in < 20% of samples. PFTriA, PFHxS PFHpS and PFDS were found in < 10% of the samples. There were no quantitative results found for 8:2 FTS, 6:2 FTS NetFOSSA, MeFOSSA, FOSA, PFHpS, PFBS and PFTeA. Concentration of total PFAS quantitatively detected ranged from 0.3 – 12.30 (ppb). The highest quantitative total PFAS concentrations were observed at locations S8B (12.30 ppb), S14 (12.24 ppb) and S13 (11.49 ppb).

Qualitative detected soil samples were pooled with the quantitative samples to examine if the same pattern as observed with the quantitative samples occurred. Many PFAS were qualitatively detected with relatively high frequencies in the soil samples upwind and downwind from Norlite. PFBA, PFPeA, PFHpA, PFOA, PFNA, PFDA, PFUnA, PFDoA, and PFOS were qualitatively detected in 90 to 100% of the samples. PFPeA, PFDoA and PFBS were qualitatively detected in 50 to < 90% of the samples. PFHxS, PFDS and PFTriA were qualitatively detected in 20 to < 50% of the samples. PFTeA was found qualitatively in < 20% of the samples. PFHpS, NetFOSSA, 6:2 FTS and 8:2 FTS were found in < 10% of the samples. There were no qualitative results found for FOSA and MeFOSSA. Concentrations of total PFAS qualitatively and quantitatively detected ranged from 0.32 – 19.0 ppb. The highest qualitative/quantitative total PFAS concentrations were observed again at locations S8B (19 ppb), S14 (14.7 ppb) and S13 (11.9 ppb).

Of specific interest are the results for the perfluoralkyl sulfonates (PFSAs). The two PFSAs detected in the highest percentages in AFFF produced in 2001 are PFOS and PFHxS.[7] The quantitative analysis found PFOS and PFHxS in less than 50% and 10% of the soil samples respectively. The qualitative analysis found PFOS and PFHxS in 94% and 25% of the soil samples respectively.

7.3 Distribution of Concentrations in Soils

7.3.1 Methods Used to Evaluate the Influence of Wind Direction on Measured Concentrations of PFAS and Metals in Soil.

Five years of meteorological data from the Albany Airport and one year of meteorological data from the Albany South End Community Air Quality Study were used to determine if the soil samples collected were upwind or downwind of the Norlite facility. (Appendix C). The Albany Airport data represents the 5-year average (2015 – 2019) of wind direction and the Albany South End data represents the one-year average

[7] Annunziato, KM, Doherty J, Lee J, Clark JM, Liang W, Clark,CW, Nguyen M, Roy MA, Timme-Laragy. 2020. Chemical Characterization of a Legacy Aqueous Film-Forming Foam Sample and Developmental Toxicity in Zebrafish (Danio rerio). Environmental Health Perspectives 128 (9) pp. 097006-1 – 097006-13. Available On-Line: https://doi.org/10.1289/EHP6470

of wind direction from August 2017 – November 2018. These data sets overlap the time-period when Norlite was incinerating AFFF foam at high combustion temperatures.

An analysis of weather patterns from this data indicate that the wind direction is most common from the south and also the winds tend to be strongest from that direction. The second most common wind direction is from the west. Thus, soil samples 1, 11, 12, 13, 14 and 15 were designated as upwind locations. Soil Samples 2,3,4,5,6,7,8,9,10 and 16 were designated as downwind locations. When the wind is blowing from the predominant direction (South) and a secondary direction from the West Northwest, the soil concentrations will be primarily influenced by sources in this area which includes Norlite (downwind locations). A comparison can be made with the soil concentrations when the wind is blowing from the opposite direction without the influences from Norlite (upwind locations). A consistent increase in PFAS and metal soil concentrations would be expected to be observed in the downwind locations if the PFAS incinerated at Norlite were not destroyed by high temperature combustion and the air pollution control equipment was not reducing emissions of the metals. The soil sampling was designed to determine if this was occurring by collecting 10 soil samples in downwind areas versus 6 soil samples in upwind areas.

7.3.2 Prevailing Wind Influences on Measured Concentrations of PFAS in Soil.

As described in section 7.3.1 above, meteorological data indicates soil samples considered to be in an upwind location include soil sample locations 1, 11, 12, 13, 14, and 15. Downwind locations include soil sample locations 2, 3, 4, 5, 6, 7, 8, 9, 10 and 16. In the upwind locations, PFOA concentrations range from 0.29 to 0.88 parts per billion (ppb), PFOS ranging from 0.46 to 9.8 ppb, lead ranging from 12.4 to 46.5 parts per million (ppm), and mercury ranging from .017 to 0.1 ppm.

In locations determined to be in prevailing downwind directions, concentrations range between 0.19 and 0.95 ppb for PFOA, 0.26 to 4.5 ppb for PFOS, 15.1 to 236 ppm for lead and 0.017 to 1.6 ppm for mercury.

Based upon the prevailing wind direction from south to north along the Hudson River Valley as shown in the wind rose data found in Appendix C, any contamination occurring as a result of emissions from combustion in the kilns would be expected to be at their highest concentrations at the downwind soil sample locations.

The PFAS soil data was examined in multiple ways to discern if there was a large difference which could be observed between the upwind and downwind samples since soil is a known reservoir for PFAS which could be atmospherically deposited.[4,5,8] The

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[8] Washington JW., Rosal CG., McCord JP., Strynar MJ., Lindstrom AB., Bergman EL., Goodrow SM,. Tadesse HK., Pilant AN., Washington BJ., Davis MJ., Stuart BG., and TM Jenkins. 2020. Nontargeted mass-spectral detection of chloroperfluoropolyether carboxylates in New Jersey soils. Science 368:6495.

soil data was also analyzed to evaluate if there was a consistent pattern between the individual PFASs detected in this study.

The full data set for all the individual PFAS qualitatively and quantitatively analyzed and determined in the upwind and downwind samples, along with total PFAS concentrations, are shown in figures in Appendix D. When evaluating the geometric means for all the individual PFAS qualitatively and quantitatively detected in the upwind and downwind samples there is no evidence of a strong upwind and downwind gradient of individual or total PFAS which would be expected to be observed if the PFAS combusted at Norlite was not destroyed by the high combustion temperatures of the kilns. The upwind concentrations of PFOA and total PFAS are higher than the downwind concentrations. A very small upwind/downwind gradient for PFNA, PFUnA, PFTriA, PFOS and PFBS was observed. (Appendix D).

Overall, there is no evidence of the strong upwind/downwind gradient being observed in these samples that would be expected to be observed if the PFAS combusted at Norlite was not destroyed by the high combustion temperature of the kilns, especially when other local sources in the area that may be contributing to these findings are considered. It should also be noted that there are other potential sources of PFAS emissions in the area which could contribute to the upwind concentrations.

Individual soil samples were examined also and the pattern that emerges is that total quantitative PFAS concentrations are the highest in the locations near a potential source which uses imported textiles that most likely contain PFAS surface coatings. The highest soil concentrations for total PFAS qualitatively and quantitatively determined were collected in Sample 13, which is near an area where textile cuttings and dust are disposed of and transported from the facility; Sample 14 which is upwind of the facility but nearby, and Sample 8, which is downwind of the facility and near the laundry room at the Saratoga Sites. A recent evaluation of PFAS concentrations in indoor dust primarily from the use of PFAS-treated textiles has found total and individual PFAS concentrations that are higher than those observed in Sample 8 and all soils samples collected in this study.[9]

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pp 1103 – 1107. Available On-Line: [Nontargeted mass-spectral detection of chloroperfluoropolyether carboxylates in New Jersey soils | Science (sciencemag.org)]

[9] Young AS, Hauser R, James-Todd TM, Coull BA, Zhu H, Kannan K, Specht AJ, Bliss MS, Allen JA. 2020. Impact of "heathier" materials intervention on dust concentrations of per and polyfluoroalkyl substances, polybrominated diphenyl ethers and organophosphate esters. Environment International. In Press. Available On-Line: https://reader.elsevier.com/reader/sd/pii/S0160412020321061?token=20C7A98B371878FEE251C4B75F1F32213F10CC535D1737735A4CD70DEE22C8D2352C0CB2BBD2AF5BC8AA573991F41F23

7.3.3 Prevailing Wind Influences on Measured Concentrations of Metals in Soil.

The full data set of all the geometric means for the individual metals analyzed in the upwind and downwind samples are shown in Appendix D. The analysis of the geometric means indicates copper is the only metal distinctly elevated above the upwind samples. It should be noted that all the metal samples results are below the applicable use-based SCOs.

7.4 Concentrations of PFAS in High and Low Flow Water Samples

Sampling was conducted during a high flow event to assess the impact of stormwater runoff on the three study area streams which were sampled. A consistent pattern of an increase in total PFAS concentrations during a high flow event was not observed in all the streams sampled. The samples from Schuyler Creek exhibited a slight increase in total PFAS concentrations during the high flow sampling event. This increase was primarily driven by increased PFBA concentrations, with smaller increases of PFPeA, PFHxA, PFBS and PFOS. The increase in PFOS was observed only in Schuyler Creek 2 sample after the creek flowed through a populated area of the village. There was no increase in PFOA during the high flow event in these samples.

The Salt Kill followed a similar pattern during the high flow event for Samples 1 through 3, but not Sample 4. The increase in total PFAS concentrations were higher than observed in the more distant and rural Schuyler Creek indicating an increase in surface water loading in this more urban area after a precipitation event. The increase was primarily driven by PFBA, PFPeA, PFHxA and PFOS. The total PFAS concentration in Salt Kill Sample 4 was higher than all the samples collected, however this sample had a unique signature in comparison to the other samples collected from the Salt Kill. It was dominated by 6:2 FTS and PFPeA as measured during the low flow event. The reason for this difference has not been determined. It is possible that there are other sources contributing to the increased low flow total PFAS concentration found in this sample including groundwater or sediments. 6:2 FTS was not observed in any other water samples collected in this study. Of significant note, PFOS followed the increased high flow loading as observed in Salt Kill samples 1 -3.

The Patroon Creek samples did not follow this pattern of increased loading during a high flow event. Overall, the Patroon Creek samples were higher in total PFAS concentrations during the low flow event, indicating a possible sediment effect which was observed in Salt Kill sample 4. In this case the stormwater runoff is diluting the total PFAS concentrations during the high flow event and the high sediment concentrations are masking any increases as observed in the other two streams during the high flow event. The results of this analysis reveal some PFAS loading into the Salt Kill and Schuyler Creeks during the high flow events, which indicates a combination of the PFAS contribution from precipitation events and stormwater runoff. This finding is not unexpected since it is known that perfluoroalkyl carboxylates are being detected in rainwater across the United States. This issue is discussed further in the PFAS in Precipitation section of this report.

Table 7.4. Differences in Total PFAS during a Low Flow and High Flow Creek Event.

Sample ID	Low Flow (Total PFAS) (ppt)	High Flow (Total PFAS) (ppt)	Difference
Schuyler Creek 1	4.34	9.44	+ 5.10
Schuyler Creek 2	9.03	12.05	+ 3.02
Salt Kill 1	10.03	18.25	+8.22
Salt Kill 2	8.64	18.91	+10.27
Salt Kill 3	10.59	19.98	+9.39
Salt Kill 4	100	28.08	- 71.92
Patroon Creek 2	64.80	33.42	- 31.38
Patroon Creek 3	41.43	34.70	-6.73
Patroon Creek 4	36.90	31.84	-5.06

7.5 Concentrations of PFAS in Ponded Waterbodies

Water samples 5,6,7 and 8 were collected in surface water bodies (quarry ponds and an un-named pond) in close proximity to Norlite. The patterns of PFAS were distinctly different between the quarry ponds, samples W5 and W6 and un-named pond samples W7 and W8. This observed difference in PFAS surface water profiles between the two areas in close proximity of each other indicates there is likely another source contributing to the PFAS water and soil concentrations. The unique surface water PFAS profiles observed in samples W7 and W8 are consistent with the use of textiles which contain PFAS used to provide resistance to water and staining.

It is well known many textiles currently manufactured and used are produced with chemical treatments using per and poly fluoroalkyl substances to provide protection against fading, water, stain, and oil penetration. The PFAS profiles of these imported textiles are changing as newer shorter chain PFAS replacements are currently being used, which includes the PFOS replacement PFBS.[10,11,12,13] . In comparison to all the other water samples collected, the

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[10] Heydebreck F, Tang J, Xie Z, Ebinghaus R. 2016. Emissions of Per- and Polyfluoroalkyl Substances in a Textile Manufacturing Plant in China and Their Relevance for Workers Exposure. Environmental Science and Technology 50 (19) Available On-Line: DOI: 10.1021/acs.est.6b03213

[11] California Environmental Protection Agency. 2019. Product-Chemical Profile for Treatments Containing Perfluoroalkyl or Polyfluoroalkyl Substances for Use on Converted Textiles and Leathers. November 2019 – Discussion Draft. Available On-Line: Product-Chemical Profile for Treatments Containing Perfluoroalkyl or Polyfluoroalkyl Substances for Use on Converted Textiles or Leathers

[12] Norwegian Environment Agency. 2017. Investigations of Sources to PFBS in the Environment. Report of 15 May 2017. Available On-Line: Investigation of sources to PFBS in the environment (miljodirektoratet.no)

[13] Li J, Xu JH, Song R, Zhu Y, Sun W, Ni J. (2020) Polyfluoroalkyl Substances in Danjiangkou Reservoir, China: Occurrence, composition, and source appointment. Science of the Total Environment

PFBS concentrations point to a local contributing source different than the other sample locations. The hightest total PFAS water concentrations were measured in the unnamed pond which is downwind and in close proximity to a manufacturer that uses textiles. Additional investigations will continue to further explore potential sources of the detections observed in this area.

PFBS was purportedly developed as a less toxic and persistent replacement for PFOS for use in surface coatings to instill water repellency and stain resistance. It is also a component used to replace PFOS in AFFF foams. A comparison of the PFAS profiles in surface water and run-off water sampling from AFFF firefighting sites indicates the PFAS profile being observed in no-name pond is related to its use in textiles, not a spill of AFFF or emissions of unburned AFFF in this study area. AFFF-contaminated sites have a unique profile, which is not being observed in any of these water samples collected in the study area. For example, surface water runoff of PFOS and PFOA from the AFFF training area in Newburgh, New York ranged from 47 – 280 ppt and 15 – 40 ppt, respectively. Our analysis of PFAS contamination around fire training sites reveals high levels of PFAS in all water samples dominated by PFOS, PFHxS, PFHxA and PFOA in rank order. None of these rank-ordered profiles were observed in any of the surface water samples collected in the vicinity of Norlite.

Table 7.5 displays the surface water ranges from three independent studies conducted in the Northeast. The results from Washington Park Lake in Albany, New York indicates the PFAS contamination profile from 2007 is still consistent with the results from the Norlite surface water samples for the analytes sampled. Recent work conducted by New Jersey Department of Environmental Protection (NJDEP) in 2018 also reveals a consistent PFAS profile, with the higher PFOS, PFHxS, PFHxA and PFOA values collected from surface waters with possible AFFF contamination. Of note in the NJDEP study, was a sample collected in a creek downstream from a carpet manufacturer. The PFAS profile in this sample matches the PFAS profile collected in the unnamed pond. Both samples contain the same nine detected individual PFASs, which provides more certainty about the textile source of contamination in no-name pond.

725:10 138352. Available On-Line: Polyfluoroalkyl substances in Danjiangkou Reservoir, China: Occurrence, composition, and source appointment - ScienceDirect

TABLE 7.5 Range of PFAS Detected in Surface Water Studies (ppt or ng/l) [14,15]

Analyte	**Washington Lake Range**[1]	**Norlite Range**[2]	**New Jersey Surface Water Range**[3]
PFBA	N/A	ND - 23	ND – 5.2
PFPeA	N/A	2.3 - 13	1.0 – 10.0
PFHxA	N/A	2.4 - 11	ND – 26.0
PFHpA	1.15 – 12.7	0.86 – 11.0	1.1 – 14.6
PFOA	3.27 – 15.8	0.97 – 5.6	1.9 – 33.9
PFNA	ND – 3.51	0.41 – 1.8	ND – 2.1
PFDA	0.25 – 3.58	ND	ND
PFUnA	ND – 1.45	0.28 – 1.8	ND
PFDoA	ND	ND	ND
PFTriA	N/A	ND	N/A
PFTeA	N/A	ND	N/A
NMeFOSSA	N/A	ND	N/A
NetFOSSA	N/A	ND	N/A
PFBS	N/A	0.56 - 100	ND – 6.6
PFHxS	ND – 4.05	1.7 – 3.4	ND – 95.9
PFHpS	N/A	ND	N/A
PFOS	ND – 9.3	2.1 – 12	ND – 102.0
PFDS	ND – 3.4	ND	N/A
PFOSA	ND – 0.47	ND	ND
6:2 FTS	ND – 1.46	ND	N/A
8:2 FTS	ND – 0.32	ND	N/A

N/A – not applicable due to limited quantitative detection.
1 – Analysis performed for 12 PFAS
2 - Analysis performed for 21 PFAS
3 – Analysis performed for 12 PFAS

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[14] Kim K. and Kannan K. 2007. Perfluorinated Acids in Air, Rain, Snow, Surface Runoff and Lakes: Relative Importance of Pathways to Contamination of Urban Lakes. *Environ. Sci. Technol.* **2007,** *41,* 8328–8334

[15] New Jersey Department of Environmental Protection (NJDEP). 2018. Investigation of Levels of Perfluorinated Compounds in New Jersey Fish, Surface Water and Sediment. Updated April 9, 2019. Available On-Line: [Investigation of Levels of Perfluorinated Compounds in New Jersey Fish, Surface Water, and Sediment (nj.gov)]

7.6 PFAS in Precipitation

The National Atmospheric Deposition Program (NADP) has recently launched a national investigation into the PFAS concentrations in rainwater across the United States. Preliminary research has identified that the shorter chain PFAS are dominating the samples. Overall concentrations were low (<1 ppt), with the sum of total PFAS being around 4 ppt. The dominant PFAS detected in rainwater were the perfluoroalkyl carboxylates. Preliminary research has indicated more individual PFAS are detected and higher concentrations of atmospheric PFAS are observed in the mid-Atlantic States.[16,17] The most extensive evaluation of PFAS atmospheric concentrations and wet deposition across the United States has been compiled by researchers in North Carolina.[18]

This research is continuing and will assist DEC by determining the chemical identity and quantity of PFAS which is currently cycling in the atmosphere and contributing to the current soil and water contamination levels being observed in this community. This research in tandem with a robust emissions testing program will be invaluable in understanding how potential sources of PFAS and PFAS precursors are contributing to atmospheric concentrations which continue to contaminate our environment.

8. Conclusions and Recommendations

8.1 Analysis of soil concentrations does not show evidence of a strong upwind / downwind gradient of PFAS and metals.

As described in this report, sampling results were analyzed using a variety of basic statistical methods. These analyses did not indicate a clearly discernible upwind / downwind gradient as is commonly found when soil samples are analyzed upwind and downwind from known emission sources of PFAS and metals. Given the absence of a deposition pattern attributable to this point source, the concentrations of PFAS observed in this study are consistent with background levels documented in the literature and more likely the result of 70 years of widespread releases to the environment since PFAS were introduced into commerce.

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[16] Schafer M., Olson M., Danielson C., Widmayer K. 2020. PFAS Deposition in Precipitation: Efficacy of the NADP – NTN & Initial Findings. Presented at WisPAC Meeting, January 2020. Available On-Line: January 16, 2020, WIsPAC Presentation - PFAS Deposition in Precipitation: Efficacy of the NADP-NTN & Initial Findings

[17] Schafer M., Olson M., Schauer J. 2020. The National Atmospheric Deposition Program: National Trends Network, A Premier Model of Multi-Sector Partnerships, Working to Provide New Information on PFAS Deposition in Precipitation. Presented at 2020 National Environmental Monitoring Conference August 14, 2020. Available On-Line: PowerPoint Presentation (nelac-institute.org)

[18] North Carolina PFAS Testing (PFAST) Network. 2019. Atmospheric Concentrations and Deposition of PFAS. Available On-Line: Air and Atmospheric Deposition of PFAS in North Carolina (nccoast.org)

Investigation by the USEPA as well as DEC to understand the sources and extent of PFAS contamination will be critical so that it can be effectively managed and/or mitigated in the future.

The analysis of the soil metal concentrations in the majority of residential soil samples did not reveal any concentrations above the restricted residential use soil cleanup objective criteria used by the DEC for making soil cleanup determinations with the exception of one sample for mercury. Some residential samples were above the unrestricted use soil cleanup objectives as discussed in the report. Overall, the upwind/downwind analysis of the metals in the soil samples did not reveal a strong gradient in soil metal concentrations in the predominant downwind area around Norlite. In addition, statistical evaluation of metals concentrations in soils does not show clear evidence of an upwind / downwind gradient for these contaminants.

8.2 Concentrations of PFOA and PFOS in soils do not indicate a human health risk.

While guidance concentrations have not been established for all PFAS compounds which were analyzed in this study, the concentrations of PFOA and PFOS found were largely below residential use values that have been established in DEC guidance. The one sample result showing a PFOS concentration exceeding the residential use value was found in a location that is not used for residential purposes and thus exposures associated with residntial property use are unlikely. Likewise, only one result for metals (mercury) exceeded a residential soil cleanup objective in regulation. This soil location is near a landfill and is also not in an area associated with residential use. In all cases, concentrations were less than the guidance use values for the current uses of the sampled property.

Recommendation: DEC and DOH will continue to evaluate health-based values for all PFAS compounds and will work to establish guidance values for additional compounds as scientific studies support these designations.

8.3 Analysis of stream concentrations at high flow and low flow indicates possible influence from soils and from precipitation, but not in locations with higher concentrations such as those found in the Patroon Creek and in the Salt Kill downstream from Norlite.

The reversal of the concentration trends in streams in areas with higher PFAS concentrations during low flow events indicates that there are likely sources of these contaminants other than from air deposition leading to increased storm-water runoff and precipitation concentrations/loading. This observation will be further evaluated by DEC in other areas of the state in the future.

Recommendation: Add PFAS monitoring requirements to Norlite's hazardous waste management permit to assess the possibility of contaminant loading from groundwater or other on-site sources.

8.4 Analysis of surface water samples in areas of ponded water on or near Norlite property indicate that there are likely sources of PFAS compounds not associated with Norlite kiln emissions.

The observed difference in PFAS surface water profiles between two ponded areas in close proximity of each other indicates there are likely other sources contributing to the PFAS water and soil concentrations. DEC believes sources contributing to the unique surface water PFAS profiles observed in samples W7 and W8 are related to the use of textiles, used to provide resistance to water and staining, which contain PFAS.

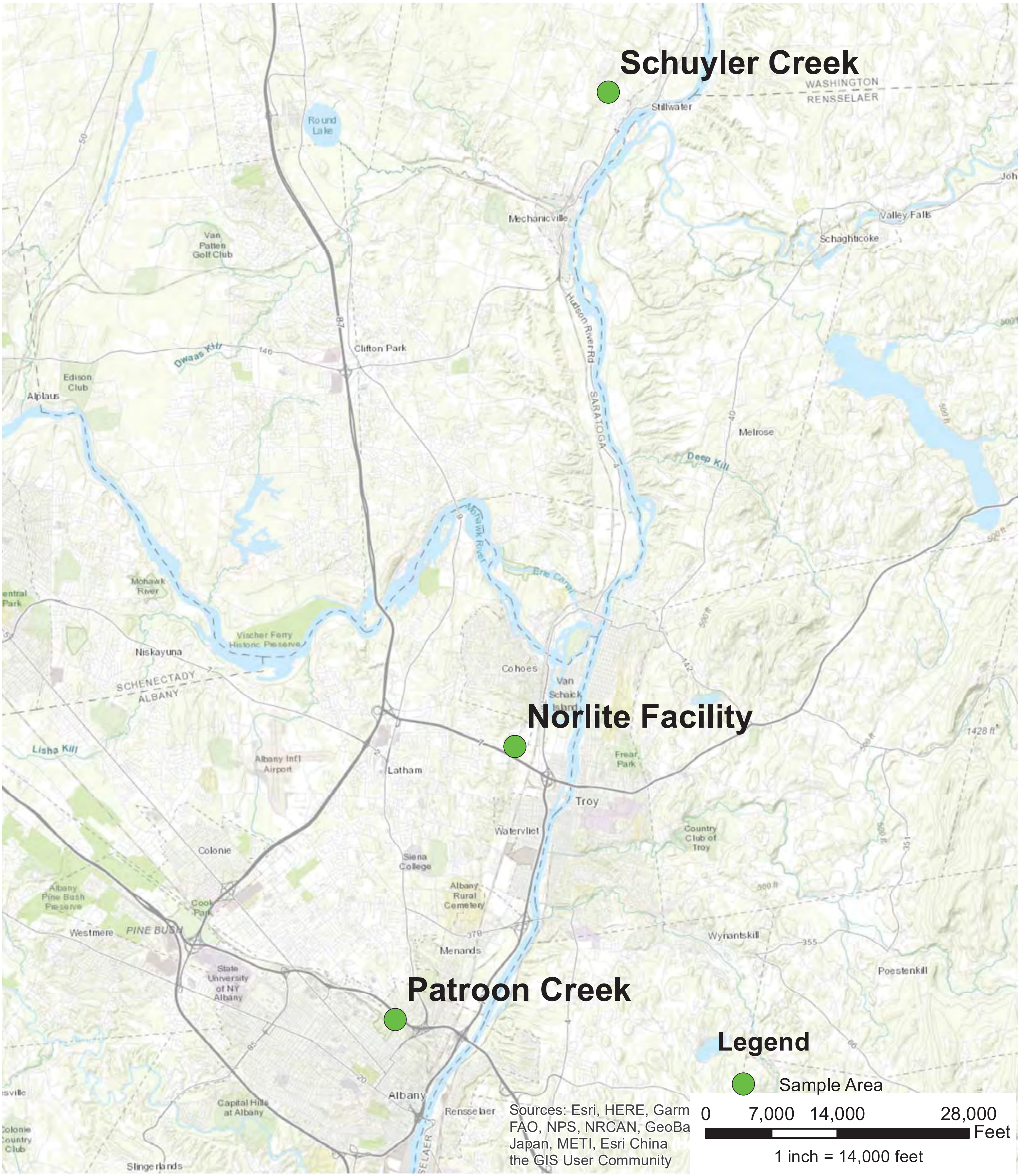
Recommendation: Investigate for other local sources of short-chained PFAS compounds. In addition, add additional monitoring requirements to Norlite's hazardous waste management permit to monitor PFAS concentrations in quarry pond water.

8.5 Source Characterization of Organic and Inorganic Fluorine Emissions:

The fate of fluorinated chemicals being emitted from the kilns can be more fully understood by using the recently developed US EPA Method OTM 45 and other analytical methods for measuring inorganic fluoride.

Recommendation: Require emissions testing which includes an analysis of inorganic and organic fluorine emissions from the kilns at Norlite. Consult with researchers from the US EPA Office of Research and Development to design an emissions study to verify the formation of hydrogen fluoride (HF) during the high temperature combustion of organic fluorinated compounds and verify compliance with the current New York State Standard (6 NYCRR Part 257-4) for gaseous fluoride.

Figures



Source Data: Aerial - 2004 Color 20cm Resolution

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Figure 1
Norlite Study
Albany County, New York

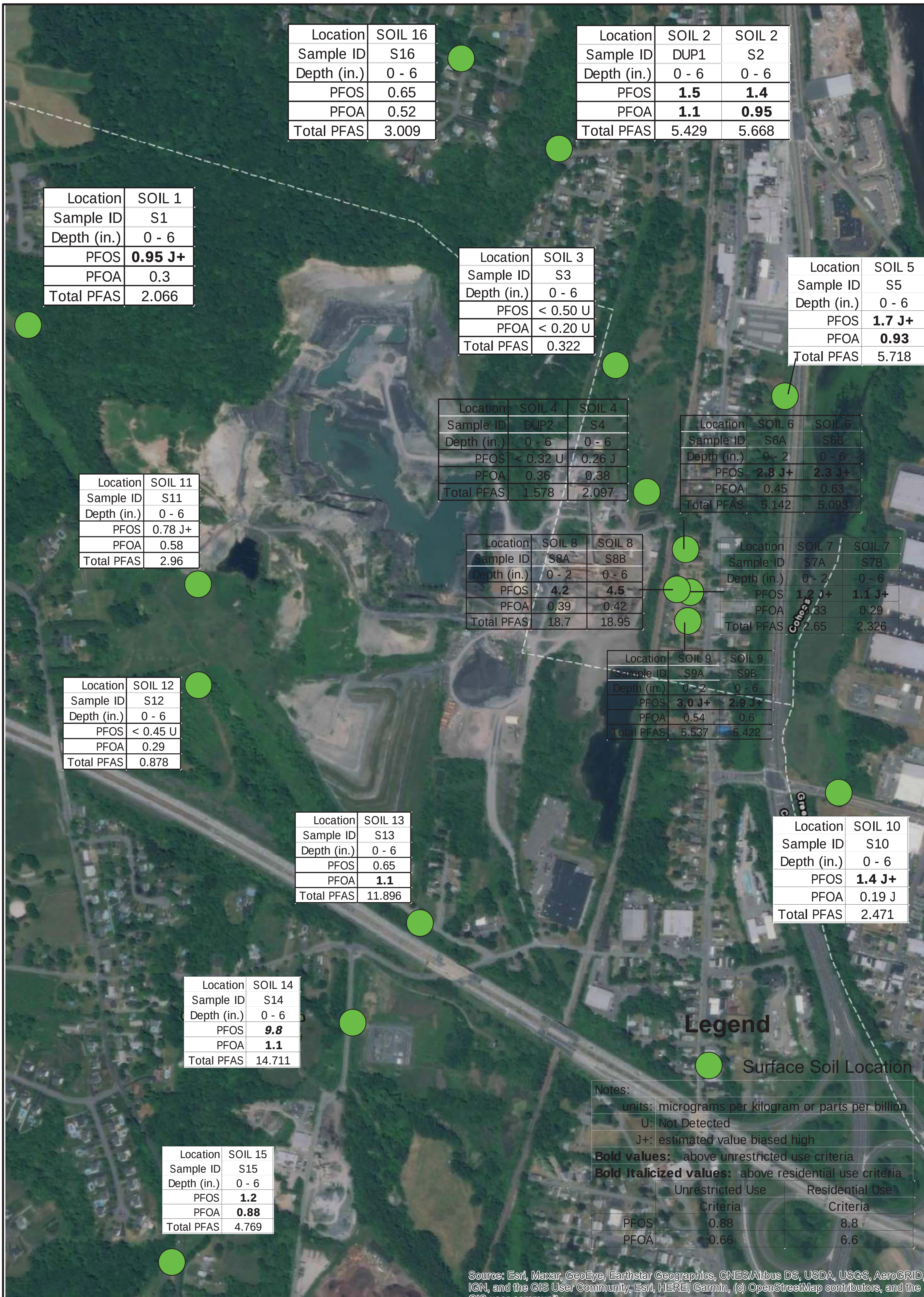

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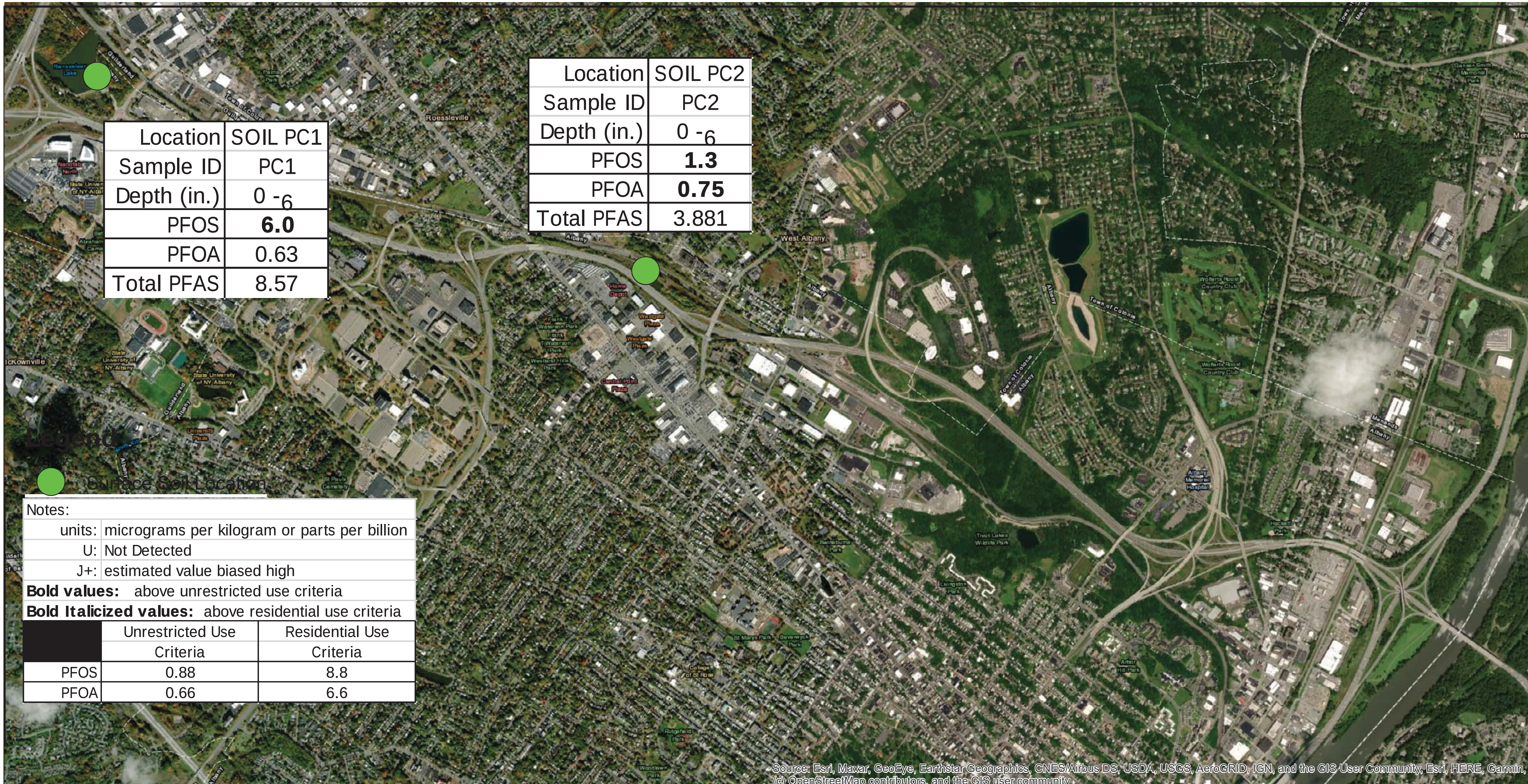
Figure 2
PFOS, PFOA, and Total PFAS Soil Results
Norlite Area
Albany County, New York

0 305 610 1,220 Feet

1 inch = 600 feet

N

October/November 2020



Location	SOIL PC1
Sample ID	PC1
Depth (in.)	0 - 6
PFOS	**6.0**
PFOA	0.63
Total PFAS	8.57

Location	SOIL PC2
Sample ID	PC2
Depth (in.)	0 - 6
PFOS	**1.3**
PFOA	**0.75**
Total PFAS	3.881

Notes:

units:	micrograms per kilogram or parts per billion
U:	Not Detected
J+:	estimated value biased high
Bold values:	above unrestricted use criteria
Bold Italicized values:	above residential use criteria

	Unrestricted Use Criteria	Residential Use Criteria
PFOS	0.88	8.8
PFOA	0.66	6.6

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Figure 3
PFOS, PFOA, and Total PFAS Soil Results
Patroon Creek Area
Albany County, New York

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

N

October/November 2020

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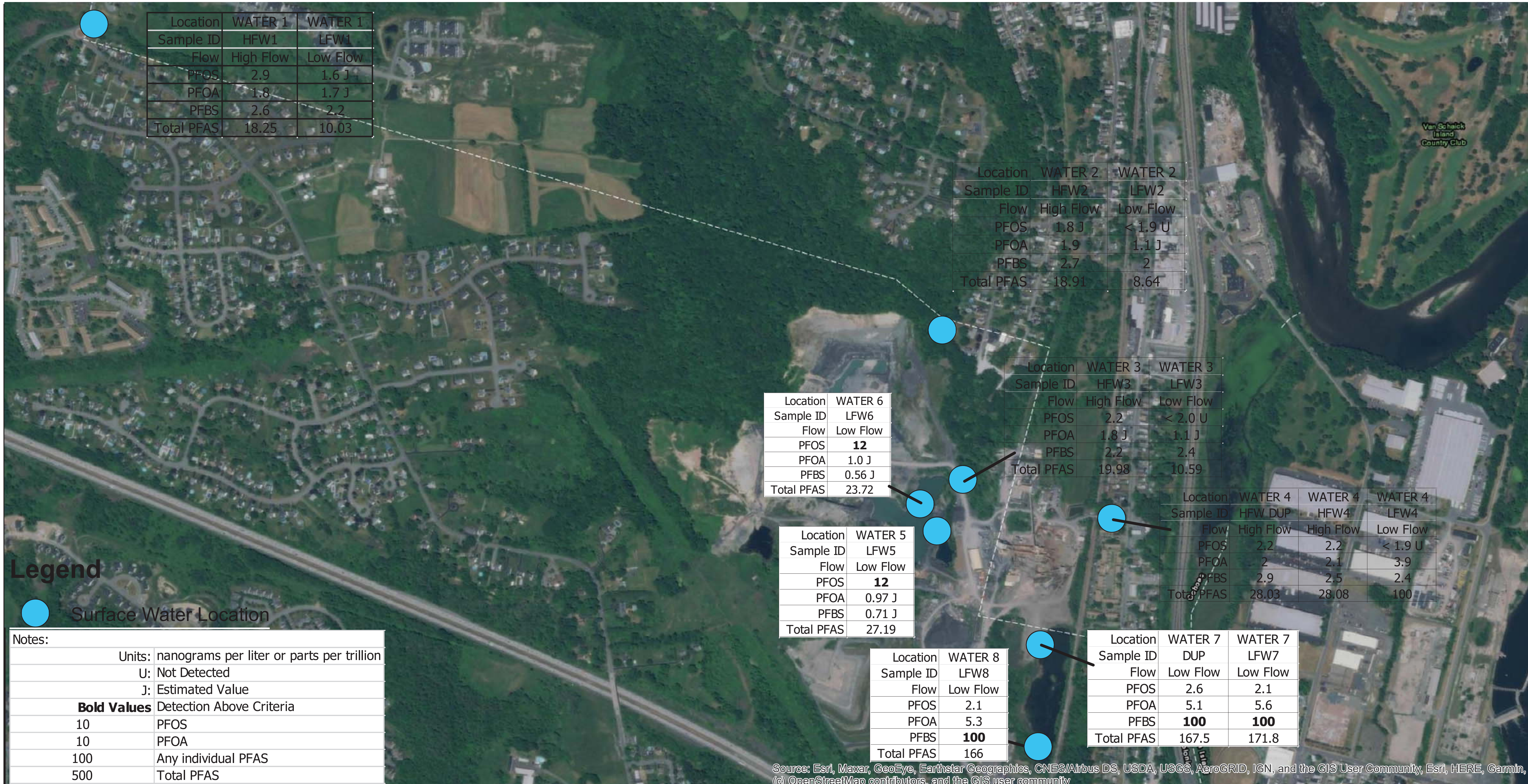
0 305 610 1,220 Feet

1 inch = 600 feet

Figure 4
Metal Soil Results Above Unrestricted Use
Norlite Area
Albany County, New York

N

October/November 2020



Location	WATER 1	WATER 1
Sample ID	HFW1	LFW1
Flow	High Flow	Low Flow
PFOS	2.9	1.6 J
PFOA	1.8	1.7 J
PFBS	2.6	2.2
Total PFAS	18.25	10.03

Location	WATER 2	WATER 2
Sample ID	HFW2	LFW2
Flow	High Flow	Low Flow
PFOS	1.8 J	< 1.9 U
PFOA	1.9	1.1 J
PFBS	2.7	2
Total PFAS	18.91	8.64

Location	WATER 3	WATER 3
Sample ID	HFW3	LFW3
Flow	High Flow	Low Flow
PFOS	2.2	< 2.0 U
PFOA	1.8 J	1.1 J
PFBS	2.2	2.4
Total PFAS	19.98	10.59

Location	WATER 6
Sample ID	LFW6
Flow	Low Flow
PFOS	**12**
PFOA	1.0 J
PFBS	0.56 J
Total PFAS	23.72

Location	WATER 4	WATER 4	WATER 4
Sample ID	HFW DUP	HFW4	LFW4
Flow	High Flow	High Flow	Low Flow
PFOS	2.2	2.2	< 1.9 U
PFOA	2	2.1	3.9
PFBS	2.9	2.5	2.4
Total PFAS	28.03	28.08	100

Location	WATER 5
Sample ID	LFW5
Flow	Low Flow
PFOS	**12**
PFOA	0.97 J
PFBS	0.71 J
Total PFAS	27.19

Location	WATER 7	WATER 7
Sample ID	DUP	LFW7
Flow	Low Flow	Low Flow
PFOS	2.6	2.1
PFOA	5.1	5.6
PFBS	**100**	**100**
Total PFAS	167.5	171.8

Location	WATER 8
Sample ID	LFW8
Flow	Low Flow
PFOS	2.1
PFOA	5.3
PFBS	**100**
Total PFAS	166

Notes:	
Units:	nanograms per liter or parts per trillion
U:	Not Detected
J:	Estimated Value
Bold Values	Detection Above Criteria
10	PFOS
10	PFOA
100	Any individual PFAS
500	Total PFAS

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Figure 5
PFOS, PFOA, PFBS, and Total PFAS
Surface Water Results
Norlite Area
Albany County, New York

0 400 800 1,600 Feet

1 inch = 800 feet

N

October/November 2020

Location	WATER PC1
Sample ID	LFPCW1
Flow	Low Flow
PFOS	4.7
PFOA	6.6
Total PFAS	54.63

Location	WATER PC2	WATER PC2
Sample ID	HFPCW2	LFPCW2
Flow	High Flow	Low Flow
PFOS	4.8	**21**
PFOA	3.2	6.5
Total PFAS	33.42	64.6

Location	WATER PC3	WATER PC3
Sample ID	HFPCW3	LFPCW3
Flow	High Flow	Low Flow
PFOS	4.5	6.7
PFOA	4.0	4.4
Total PFAS	34.76	41.43

Location	WATER PC4	WATER PC4
Sample ID	HFPCW4	LFPCW4
Flow	High Flow	Low Flow
PFOS	4.5	5.8
PFOA	3.4	4.1
Total PFAS	31.84	36.9

Legend

Surface Water Location

Notes:	
Units:	nanograms per liter or parts per trillion
U:	Not Detected
J:	Estimated Value
Bold Values:	Detection Above Criteria
10	PFOS
10	PFOA
100	Any individual PFAS
500	Total PFAS

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Figure 6
PFOS, PFOS, and Total PFAS Surface Water Results Patroon Creek Area Albany County, New York

October/November 2020

Location	WATER SC2	WATER SC2
Sample ID	HFSCW2	LFSCW2
Flow	High Flow	Low Flow
PFOS	0.95 J	< 1.9 U
PFOA	1.4 J	1.6 J
Total PFAS	9.44	4.34

Location	WATER SC1	WATER SC1
Sample ID	HFSCW1	LFSCW1
Flow	High Flow	Low Flow
PFOS	1.1 J	1.7 J
PFOA	1.8 J	1.8 J
Total PFAS	12.05	9.05

Legend

Surface Water Location

Notes:	
Units:	nanograms per liter or parts per trillion
U:	Not Detected
J:	Estimated Value
Bold Values:	Detection Above Criteria
10	PFOS
10	PFOA
100	Any individual PFAS
500	Total PFAS

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Figure 7
PFOS, PFOA, and Total PFAS Surface Water Results Schuyler Creek Area Saratoga County, New York

0 400 800 1,600 Feet

1 inch = 800 feet

N

October/November 2020

Tables

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Table 1
Norlite Area Investigation
Sample Locations and Description

Site ID	LOCATION	LATITUDE	LONGITUDE	ANALYSES
Soil 1	Norlite Property	42.75804605	-73.71673	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 2	Off-site	42.76100097	-73.704122	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 3	Norlite Property	42.75720798	-73.702848	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 4	Norlite Property	42.75504483	-73.70223	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 5	Off-Site	42.75662583	-73.69885	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 6(a,b)	Cohoes Housing Authority	42.75399417	-73.701248	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 7(a,b)	Cohoes Housing Authority	42.75324278	-73.701162	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 8(a,b)	Cohoes Housing Authority	42.75274306	-73.701225	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury, TOP Assay (Soil 8b)
Soil 9(a,b)	Cohoes Housing Authority	42.75274356	-73.701226	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 10	Off-site	42.74969361	-73.697726	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 11	Norlite Property	42.75348835	-73.712804	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 12	Norlite Property	42.75173317	-73.712829	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 13	Off-site	42.74751773	-73.707682	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 14	Off-site	42.7580473	-73.70932	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil 15	Off-site	42.74167	-73.713694	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury, TOP Assay
Soil 16	Off-site	42.76260021	-73.704122	PFAS Modified 21, Hexavalent Chromium, Metals, Mercury
Soil PC1	Patroon Creek	42.6970986	-73.831029	PFAS Modified 21
Soil PC2	Patroon Creek	42.68582622	-73.78982	PFAS Modified 21
Water 1	Salt Kill Norlite Property	42.76573167	-73.73163	PFAS Modified 21
Water 2	Salt Kill Norlite Property	42.7586184	-73.708186	PFAS Modified 21
Water 3	Salt Kill Norlite Property	42.75528025	-73.705555	PFAS Modified 21
Water 4	Salt Kill Norlite Property Downgradient	42.7543632	-73.705287	PFAS Modified 21, TOP Assay
Water 5	Norlite Property	42.75399167	-73.706342	PFAS Modified 21
Water 6	Norlite Property	42.75473194	-73.706872	PFAS Modified 21
Water 7	Off-site Surface Waterbody	42.75155667	-73.703293	PFAS Modified 21, TOP Assay
Water 8	Off-site Surface Waterbody	42.74930139	-73.703398	PFAS Modified 21
Water PC1	6 Mile Reservoir	42.6972244	-73.731317	PFAS Modified 21
Water PC2	Patroon Creek	42.6856165	-73.789469	PFAS Modified 21
Water PC3	Patroon Creek	42.67144944	-73.758501	PFAS Modified 21
Water PC4	Patroon Creek	42.65956167	-73.738226	PFAS Modified 21
Water SC1	Schuyler Creek	42.93756178	-73.657972	PFAS Modified 21
Water SC2	Schuyler Creek	42.97425	-73.671394	PFAS Modified 21

Note: EPA Method 537 (modified) used to analyze for PFAS. Methods 6010D, 7471B (mercury) and 7196A (hexavalent chromium) used to analyze for metals.

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Table 2
Norlite Area Investigation
Soil Per- and Polyfluoroalkyl Substances (PFAS) Results - October 2020

Location Sample ID Sample Date Depth (inches)	Unrestricted Use Criteria	Residential Use Criteria	SOIL 1 S1 10/21/2020 0 - 6	SOIL 2 DUP1 10/21/2020 0 - 6	SOIL 2 S2 10/21/2020 0 - 6	SOIL 3 S3 10/21/2020 0 - 6	SOIL 4 DUP2 10/21/2020 0 - 6	SOIL 4 10/21/2020 0 - 6	SOIL 5 S5 10/21/2020 0 - 6	SOIL 6 S6A 10/21/2020 0 - 2	SOIL 6 S6B 10/21/2020 0 - 6	SOIL 7 S7A 10/21/2020 0 - 2	SOIL 7 S7B 10/21/2020 0 - 6
CHEMICAL NAME													
Perfluorooctanesulfonic acid (PFOS)	0.88	8.8	**0.95 J+**	**1.5**	**1.4**	< 0.50 U	< 0.62 U 34	0.26 J	**1.7 J+**	**2.8 J+**	**2.3 J+**	**1.2 J+**	**1.1 J+**
Perfluorooctanoic acid (PFOA)	0.66	6.6	0.30	**1.1**	**0.95**	< 0.20 U	0.36	0.38	**0.93**	0.45	0.63	0.33	0.29
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NC	NC	< 2.7 U	< 2.8 U	< 2.9 U	< 2.0 U	< 2.5 U	< 2.4 U	< 2.6 U	< 2.7 U	< 2.6 U	< 2.7 U	< 2.5 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NC	NC	< 2.7 U	< 2.8 U	< 2.9 U	< 2.0 U	< 2.5 U	< 2.4 U	< 2.6 U	< 2.7 U	< 2.6 U	< 2.7 U	< 2.5 U
Perfluorobutanesulfonic acid (PFBS)	NC	NC	< 0.27 U	0.26 J	0.25 J	< 0.20 U	0.033 J	0.050 J	0.075 J	0.093 J	0.089 J	0.059 J	0.056 J
Perfluorobutanoic acid (PFBA)	NC	NC	0.19 J	0.55	0.59	0.10 J	0.38	0.50	0.71	0.22 J	0.34	0.21 J	0.16 J
Perfluorodecanesulfonic Acid (PFDS)	NC	NC	< 0.27 U	< 0.28 U	< 0.29 U	< 0.20 U	< 0.25 U	< 0.24 U	0.26 UJ	0.15 J	0.15 J	0.067 J	0.075 J
Perfluorodecanoic acid (PFDA)	NC	NC	0.092 J	0.24 J	0.32	< 0.20 U	0.066 J	0.089 J	0.35			0.11 J	0.16 J
Perfluorododecanoic acid (PFDoA)	NC	NC	< 0.27 U	0.11 J	0.14 J	< 0.20 U	< 0.25 U	< 0.24 U	0.16 J	0.15 J	0.14 J	< 0.27 U	< 0.25 U
Perfluoroheptanesulfonic acid (PFHpS)	NC	NC	< 0.27 U	< 0.28 U	< 0.29 U	< 0.20 U	< 0.25 U	< 0.24 U	< 0.26 U	< 0.27 U	< 0.26 U	< 0.27 U	< 0.25 U
Perfluoroheptanoic acid (PFHpA)	NC	NC	0.10 J	0.29	0.30	0.063 J	0.16 J	0.17 J	0.29 0.40	0.13 J 0.34	0.17 J	0.11 J	0.085 J
Perfluorohexanesulfonic acid (PFHxS)	NC	NC	< 0.27 U	0.052 J	0.049 J	< 0.20 U	< 0.25 U	< 0.24 U	< 0.26 U	0.059 J	0.064 J	0.044 J	< 0.25 U
Perfluorohexanoic acid (PFHxA)	NC	NC	0.084 J	0.27 J	0.32	0.080 J	0.15 J	0.20 J	0.23 J	< 0.27 U	0.16 J	0.13 J	0.12 J
Perfluorononanoic acid (PFNA)	NC	NC	0.19 J	0.43	0.45	< 0.20 U	0.17 J	0.17 J	0.49			0.17 J	0.16 J
Perfluorooctanesulfonamide (FOSA)	NC	NC	< 0.27 U	< 0.28 U	< 0.29 U	< 0.20 U	< 0.25 U	< 0.24 U	< 0.26 U	< 0.27 U	< 0.26 U	< 0.27 U	< 0.25 U
Perfluoropentanoic acid (PFPeA)	NC	NC	< 0.27 U	0.29	0.37	0.079 J	0.16 J	0.20 J	0.31	0.16 J	0.23 J	0.11 J	< 0.25 U
Perfluorotetradecanoic acid (PFTeA)	NC	NC	< 0.27 U	< 0.28 U	0.079 J	< 0.20 U	< 0.25 U	< 0.24 U	0.093 J 0.32	< 0.27 U 0.31	< 0.26 U	< 0.27 U	< 0.25 U
Perfluorotridecanoic acid (PFTriA)	NC	NC	< 0.27 U	0.087 J	0.11 J	< 0.20 U	< 0.25 U	< 0.24 U	0.10 J	< 0.27 U	< 0.26 U	< 0.27 U	< 0.25 U
Perfluoroundecanoic acid (PFUnA)	NC	NC	0.16 J	0.25 J	0.34	< 0.20 U	0.099 J	0.078 J	0.28	0.21 J	0.17 J	0.11 J	0.12 J
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	NC	NC	< 2.7 U	< 2.8 U	< 2.9 U	< 2.0 U	< 2.5 U	< 2.4 U	< 2.6 U	< 2.7 U	< 2.6 U	< 2.7 U	< 2.5 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	NC	NC	< 2.7 U	< 2.8 U	< 2.9 U	< 2.0 U	< 2.5 U	< 2.4 U	< 2.6 U	< 2.7 U	< 2.6 U	< 2.7 U	< 2.5 U
Total Per- and Polyfluoroalkyl Substances (PFAS)	NC	NC	2.066	5.429	5.668	0.322	1.578	2.097	5.978	5.142	5.093	2.65	2.326

Notes:

Units: micrograms per kilogram or parts per billion
U: Not Detected
J: Estimated Value
J+: Estimated Value but may be biased high
J-: Estimated Value but may be biased low
B: Compound was found in the blank and sample
NC: No Criteria
Duplicates: DUP1 duplicate of S2 and DUP2 duplicate of S4
Bold Values: Detection above NYSDEC Guidance Value for Unrestricted Use
Bold Italicized Values: Detection above NYSDEC Guidance Value for Residential Use

Table 2 Continued
Norlite Area Investigation
Soil Per- and Polyfluoroalkyl Substances (PFAS) Results - October 2020

Location Sample ID Sample Date Depth (inches)	Unrestricted Use Criteria	Residential Use Criteria	SOIL 8 S8A 10/21/2020 0 - 2	SOIL 8 S8B 10/21/2020 0 - 6	SOIL 9 S9A 10/21/2020 0 - 2	SOIL 9 S9B 10/21/2020 0 - 6	SOIL 10 S10 10/21/2020 0 - 6	SOIL 11 S11 10/21/2020 0 - 6	SOIL 12 S12 10/21/2020 0 - 6	SOIL 13 S13 10/21/2020 0 - 6	SOIL 14 S14 10/21/2020 0 - 6	SOIL 15 S15 10/21/2020 0 - 6	SOIL 16 S16 10/21/2020 0 - 6
CHEMICAL NAME													
Perfluorooctanesulfonic acid (PFOS)	0.88	8.8	**4.2**	**4.5**	**3.0 J+**	**2.9 J+**	**1.4 J+**	0.78 J+	< 0.61 U	0.65	***9.8***	**1.2**	0.65
Perfluorooctanoic acid (PFOA)	0.66	6.6	0.39	0.42	0.54	0.60	0.19 J	0.58		**1.1**	**1.1**	**0.88**	0.52
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NC	NC	< 2.4 U	< 2.4 U	< 2.5 U	< 2.5 U	< 3.1 U	< 2.7 U	< 2.4 U	< 2.4 U	< 2.5 U	< 3.0 U	< 2.4 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NC	NC	1.4 J	1.5 J	< 2.5 U	< 2.5 U	< 3.1 U	< 2.7 U 0.29	< 2.4 U	< 2.4 U	< 2.5 U	< 3.0 U	< 2.4 U
Perfluorobutanesulfonic acid (PFBS)	NC	NC	0.15 J	0.12 J	0.092 J	0.079 J	< 0.31 U	< 0.27 U	< 0.24 U	< 0.24 U	0.044 J	0.046 J	0.11 J
Perfluorobutanoic acid (PFBA)	NC	NC	0.10 J	0.20 J	< 0.25 U	< 0.25 U	0.15 J	0.27	0.089 J	0.90	0.45	0.28 J	0.45
Perfluorodecanesulfonic Acid (PFDS)	NC	NC	5.9	5.7	0.19 J-	0.16 J-	< 0.31 UJ	< 0.27 U	< 0.24 U	< 0.24 U	< 0.25 U	< 0.30 U	< 0.24 U
Perfluorodecanoic acid (PFDA)	NC	NC	0.91	0.88	0.25	0.27	0.20 J	0.21 J	0.073 J	2.1	0.27	0.35	0.21 J
Perfluorododecanoic acid (PFDoA)	NC	NC	0.47	0.35	0.12 J	0.14 J	< 0.31 U	< 0.27 U	< 0.24 U	0.28	0.11 J	0.15 J	0.089 J
Perfluoroheptanesulfonic acid (PFHpS)	NC	NC	< 0.24 U	< 0.24 U	< 0.25 U	< 0.25 U	< 0.31 U	< 0.27 U	< 0.24 U	< 0.24 U	0.047 J	< 0.30 U	< 0.24 U
Perfluoroheptanoic acid (PFHpA)	NC	NC	0.090 J	0.13 J	0.15 J	0.15 J	0.071 J	0.18 J	0.065 J	1.0	0.24 J	0.26 J	0.19 J
Perfluorohexanesulfonic acid (PFHxS)	NC	NC	< 0.24 U	< 0.24 U	0.075 J	0.073 J	< 0.31 U	< 0.27 U	< 0.24 U	< 0.24 U	1.5	< 0.30 U	< 0.24 U
Perfluorohexanoic acid (PFHxA)	NC	NC	0.24	0.28	0.22 J	0.20 J	0.11 J	0.13 J	0.061 J	1.1	0.27	0.27 J	0.19 J
Perfluorononanoic acid (PFNA)	NC	NC	2.4	2.4	0.23 J	0.24 J	0.13 J	0.41	0.17 J	1.2	0.35	0.37	0.29
Perfluorooctanesulfonamide (FOSA)	NC	NC	< 0.24 U	< 0.24 U	< 0.25 U	< 0.25 U	< 0.31 U	< 0.27 U	< 0.24 U	< 0.24 U	< 0.25 U	< 0.30 U	< 0.24 U
Perfluoropentanoic acid (PFPeA)	NC	NC	0.20 J	0.28	0.21 J	0.20 J	< 0.31 U	0.10 J	< 0.24 U	1.6	0.24 J	0.19 J	0.17 J
Perfluorotetradecanoic acid (PFTeA)	NC	NC	0.14 J	0.13 J	< 0.25 U	< 0.25 U	< 0.31 U	< 0.27 U	< 0.24 U	0.066 J	< 0.25 U	< 0.30 U	< 0.24 U
Perfluorotridecanoic acid (PFTriA)	NC	NC	0.31	0.26	< 0.25 U	< 0.25 U	< 0.31 U	< 0.27 U	< 0.24 U	0.11 J	0.090 J	0.089 J	< 0.24 U
Perfluoroundecanoic acid (PFUnA)	NC	NC	1.8	1.8	0.22 J	0.22 J	0.22 J	0.30 J	0.13 J	0.86	0.20 J	0.27 J	0.14 J
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	NC	NC	< 2.4 U	< 2.4 U	< 2.5 U	< 2.5 U	< 3.1 U	< 2.7 U	< 2.4 U	0.70 J	< 2.5 U	< 3.0 U	< 2.4 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	NC	NC	< 2.4 U	< 2.4 U	< 2.5 U	< 2.5 U	< 3.1 U	< 2.7 U	< 2.4 U	0.23 J	< 2.5 U	< 3.0 U	< 2.4 U
Total Per- and Polyfluoroalkyl Substances (PFAS)	NC	NC	18.7	18.95	5.297	5.232	2.471	2.96	0.878	11.896	14.711	4.769	3.009

Notes:

Units: micrograms per kilogram or parts per billion
U: Not Detected
J: Estimated Value
J+: Estimated Value but may be biased high
J-: Estimated Value but may be biased low
B: Compound was found in the blank and sample
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Duplicates: DUP1 duplicate of S2 and DUP2 duplicate of S4
Bold Values: Detection above NYSDEC Guidance Value for Unrestricted Use
Bold Italicized Values: Detection above NYSDEC Guidance Value for Residential Use

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Table 2 Continued
Norlite Area Investigation
Soil Per- and Polyfluoroalkyl Substances (PFAS) Results - October 2020

Location Sample ID Sample Date Depth (inches)	Unrestricted Use Criteria UUSCO	Residential Use Criteria RSCO	SOIL PC1 PC1 10/21/2020 0 - 6	SOIL PC2 PC2 10/21/2020 0 - 6
CHEMICAL NAME				
Perfluorooctanesulfonic acid (PFOS)	0.88	8.8	**6.0**	**1.3**
Perfluorooctanoic acid (PFOA)	0.66	6.6	0.63	**0.75**
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NC	NC	< 3.3 U	< 2.4 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NC	NC	< 3.3 U	< 2.4 U
Perfluorobutanesulfonic acid (PFBS)	NC	NC	< 0.51 U	< 0.24 U
Perfluorobutanoic acid (PFBA)	NC	NC	0.26 J	0.54
Perfluorodecanesulfonic Acid (PFDS)	NC	NC	< 0.33 U	0.078 J
Perfluorodecanoic acid (PFDA)	NC	NC	0.37	0.15 J
Perfluorododecanoic acid (PFDoA)	NC	NC	< 0.33 U	< 0.24 U
Perfluoroheptanesulfonic acid (PFHpS)	NC	NC	< 0.33 U	< 0.24 U
Perfluoroheptanoic acid (PFHpA)	NC	NC	0.18 J	0.23 J
Perfluorohexanesulfonic acid (PFHxS)	NC	NC	0.21 J	0.053 J
Perfluorohexanoic acid (PFHxA)	NC	NC	0.27 J	0.20 J
Perfluorononanoic acid (PFNA)	NC	NC	0.27 J	0.25
Perfluorooctanesulfonamide (FOSA)	NC	NC	< 0.33 U	< 0.24 U
Perfluoropentanoic acid (PFPeA)	NC	NC	0.20 J	0.22 J
Perfluorotetradecanoic acid (PFTeA)	NC	NC	< 0.33 U	< 0.24 U
Perfluorotridecanoic acid (PFTriA)	NC	NC	< 0.33 U	< 0.24 U
Perfluoroundecanoic acid (PFUnA)	NC	NC	0.18 J	0.11 J
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	NC	NC	< 3.3 U	< 2.4 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	NC	NC	< 3.3 U	< 2.4 U
Total Per- and Polyfluoroalkyl Substances (PFAS)	NC	NC	8.57	3.881

Notes:

Units:	micrograms per kilogram or parts per billion
U:	Not Detected
J:	Estimated Value
B:	Compound was found in the blank and sample
NC:	No Criteria
Duplicates:	DUP1 duplicate of S2 and DUP2 duplicate of S4
Bold Values:	Detection above NYSDEC Guidance Value for Unrestricted Use
Bold Italicized Values:	Detection above NYSDEC Guidance Value for Residential Use

Table 3
Norlite Area Investigation
Soil Per- and Polyfluoroalkyl Substances (PFAS) TOP Assay Results - October 2020

Location Sample ID Sample Date Depth (inches) FRACTION	SOIL 8 S8B 10/21/2020 0-6 TOP_Post	SOIL 8 S8B 10/21/2020 0-6 TOP_Pre	SOIL 15 S15 0-6 TOP_Post	SOIL 15 S15 0-6 TOP_Pre
CHEMICAL_NAME				
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	< 6.2 U	< 6.2 U	10/21/2020 < 8.0 U	10/21/2020 < 8.0 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	< 6.2 U	< 6.2 U	< 8.0 U	< 8.0 U
Perfluorobutanesulfonic acid (PFBS)	0.18 J	0.14 J	< 0.80 U	< 0.80 U
Perfluorobutanoic acid (PFBA)	2.2 BT	0.16 J	1.2 BT	0.25 J
Perfluorodecanesulfonic Acid (PFDS)	4.1	4.8	< 0.80 U	< 0.80 U
Perfluorodecanoic acid (PFDA)	0.83	0.80	0.29 J	0.32 J
Perfluorododecanoic acid (PFDoA)	0.44 J	0.36 J	< 0.80 U	< 0.80 U
Perfluoroheptanesulfonic acid (PFHpS)	< 0.62 U	< 0.62 U	< 0.80 U	< 0.80 U
Perfluoroheptanoic acid (PFHpA)	0.36 J	0.13 J	0.24 J	0.22 J
Perfluorohexanesulfonic acid (PFHxS)	< 0.62 U	< 0.62 U	< 0.80 U	< 0.80 U
Perfluorohexanoic acid (PFHxA)	0.56 J	0.23 J	0.42 J	0.18 J
Perfluorononanoic acid (PFNA)	1.9	1.9	0.36 J	0.36 J
Perfluorooctanesulfonamide (FOSA)	< 0.62 U	< 0.62 U	< 0.80 U	< 0.80 U
Perfluorooctanesulfonic acid (PFOS)	3.6	3.9	0.95 J	1.1 J
Perfluorooctanoic acid (PFOA)	1.2 T	0.40 J	0.80 T	0.83
Perfluoropentanoic acid (PFPeA)	0.50 J	0.27 J	< 0.80 U	< 0.80 U
Perfluorotetradecanoic acid (PFTeA)	0.19 J	< 0.62 U	< 0.80 U	< 0.80 U
Perfluorotridecanoic acid (PFTriA)	0.35 J	0.22 J	< 0.80 U	< 0.80 U
Perfluoroundecanoic acid (PFUnA)	1.0	1.2	0.22 J	0.31 J
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	< 6.2 U	< 6.2 U	< 8.0 U	< 8.0 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	< 6.2 U	< 6.2 U	< 8.0 U	< 8.0 U

Notes:

Units: micrograms per kilogram or parts per billion
U: Not Detected
J: Estimated Value

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Table 4
Norlite Area Investigation
Soil Sample Results - Metals

Location Sample ID Sample Date Depth (inches)	Unrestricted Use Criteria	Residential Use Criteria	SOIL 1 S1 10/21/2020 0 - 6	SOIL 2 DUP1 10/21/2020 0 - 6	SOIL 2 S2 10/21/2020 0 - 6	SOIL 3 S3 10/21/2020 0 - 6	SOIL 4 DUP2 10/21/2020 0 - 6	SOIL 4 S4 10/21/2020 0 - 6	SOIL 5 S5 10/21/2020 0 - 6	SOIL 6 S6A 10/21/2020 0 - 6	SOIL 6 S6B 10/21/2020 0 - 6	SOIL 7 S7A 10/21/2020 0 - 2	SOIL 7 S7B 10/21/2020 0 - 6	SOIL 8 S8A 10/21/2020 0 - 2	SOIL 8 S8B 10/21/2020 0 - 6
CHEMICAL_NAME															
Aluminum	NC	NC	11900	17400	18100	15400	19200	20400	9780	12000	12200	9130	9790	7790	7530
Antimony	NC	NC	< 4.3 U	1.7 J	< 5.6 U	1.3 J	< 3.9 U	< 5.1 U	< 4.6 U	< 4.0 U	< 4.2 U	< 4.2 U	< 3.9 U	< 4.2 U	< 4.0 U
Arsenic	13	16	4.9	10.1	9.6	8.4	7.7	6.9	6.5	8.5	8.6	7.2	7.4	10.5	9.9
Barium	350	350	46.9	141	146	150	114	125	80.2	105	109	81.6	83.5	88.2	86.8
Beryllium	7.2	14	0.54	0.80	0.80	0.71	0.93	0.87	0.52	0.59	0.62	0.43	0.43	0.31 J	0.31 J
Cadmium	2.5	2.5	< 0.87 U	0.84 J	0.86 J	0.66 J	< 0.79 U	0.66 J	0.30 J	0.091 J	0.084 J	0.31 J	0.26 J	0.23 J	0.23 J
Calcium	NC	NC	940 J	6890	8480	6760	3160	3510	4120	2450	2470	4370	5300	3320	3120
Chromium, Hexavalent	1	22	< 2.7 U	< 2.9 U	< 3.0 U	< 2.2 U	< 2.6 U	< 2.6 U	< 2.9 U	< 2.7 U	< 2.6 U	< 2.7 U	< 2.5 U	< 2.6 U	< 2.5 U
Chromium, Total	30	36	14.8	24.8	24.9	23.1	21.0	22.4	17.5	17.0	17.4	14.0	15.8	15.8	15.3
Cobalt	NC	30	6.6 J	14.3	14.4	15.9	14.6	15.5	8.7 J	10.8	10.7	8.1 J	8.7 J	6.1 J	5.8 J
Copper	50	270	12.4	37.8	37.8	44.3	23.3	24.8	32.5	27.9	26.9	25.2	24.9	32.6	32.6
Iron	NC	2000	***18700***	***33300***	***34400***	***34200***	***32300***	***34400***	***20200***	***22000***	***22000***	***18600***	***20100***	***14200***	***14200***
Lead	63	400	19.4	45.7	43.2	25.1	12.8	15.1	**70.0**	38.5	39.8	23.0	25.7	48.8	**73.0**
Magnesium	NC	NC	2230	6320	6740	8480	5380	5870	2970	3740	3670	3810	4330	2550	2460
Manganese	1600	2000	288	647	642	923	500	596	425	722	714	447	491	332	341
Mercury	0.18	0.81	0.048	0.078	0.074	0.017	0.022	0.022	0.17	0.051	0.053	0.027	0.034	0.076	0.080
Nickel	30	140	13.9	**32.1**	**32.4**	**33.8**	26.3	28.1	18.7	20.7	20.7	17.7	19.3	15.6	15.5
Potassium	NC	NC	640 J	3270	3280	1660	2460	2900	1410	1360	1240	1470	1430	960 J	858 J
Selenium	3.9	36	< 4.3 U	< 5.6 U	< 5.6 U	< 4.2 U	1.1 J	< 5.1 U	< 4.6 U	< 4.0 U	< 4.2 U	1.3 J	< 3.9 U	< 4.2 U	< 4.0 U
Silver	2	36	< 2.2 U	< 2.8 U	< 2.8 U	< 2.1 U	< 2.0 U	< 2.5 U	< 2.3 U	< 2.0 U	< 2.1 U	< 2.1 U	< 1.9 U	< 2.1 U	< 2.0 U
Sodium	NC	NC	< 1080 U	139 J	144 J	< 1060 U	90.6 J	125 J	< 1140 U	< 1010 U	< 1050 U	< 1050 U	< 963 U	150 J	132 J
Thallium	NC	NC	< 4.3 U	< 5.6 U	< 5.6 U	< 4.2 U	0.91 J	< 5.1 U	0.80 J	1.1 J	1.0 J	< 4.2 U	0.96 J	< 4.2 U	< 4.0 U
Vanadium	NC	100	23.8	35.9	36.2	25.9	30.9	33.7	26.2	26.2	27.2	22.1	22.9	23.4	23.3
Zinc	109	2200	45.4	**134**	**132**	85.3	72.1	78.5	**150**	95.3	101	76.5	78.9	96.9	91.6

Notes:

Units: milligrams per kilogram or parts per million
NC: No Criteria
U: Not Detected
J: Estimated Value
Duplicates: DUP1 duplicate of S2 and DUP2 duplicate of S4
Bold Values: Detection above Part 375 Unrestricted Use Soil Cleanup Objective
Bold Italicized Values: Detection above either Part 375 Residential Use Soil Cleanup Objective or CP-51 Residential Use Soil Cleanup Objective

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Table 4 Continued
Norlite Area Investigation
Soil Sample Results - Metals

Location Sample ID Sample Date Depth (inches)	Unrestricted Use SCO	Residential Use SCO	SOIL 9 S9A 10/21/2020 0 - 2	SOIL 9 S9B 10/21/2020 0 - 6	SOIL 10 S10 10/21/2020 0 - 6	SOIL 11 S11 10/21/2020 0 - 6	SOIL 12 S12 10/21/2020 0 - 6	SOIL 13 S13 10/21/2020 0 - 6	SOIL 14 S14 10/21/2020 0 - 6	SOIL 15 S15 10/21/2020 0 - 6	SOIL 16 S16 10/21/2020 0 - 6
CHEMICAL_NAME											
Aluminum	NC	NC	9210	10300	10400	17400	11500	13100	16800	21300	15900
Antimony	NC	NC	< 4.1 U	< 3.9 UT	< 6.2 U	< 5.1 U	< 3.7 U	< 5.1 UT	1.7 J	< 6.2 U	< 4.8 U
Arsenic	13	16	7.8	7.8	7.4	6.2	6.2	5.1	8.1	7.8	6.4
Barium	350	350	101	103	95.3	110	63.9	112	126	152	106
Beryllium	7.2	14	0.43	0.45	0.14 J	0.71	0.58	0.56	0.77	0.93	0.68
Cadmium	2.5	2.5	0.18 J	0.15 J	0.34 J	0.63 J	< 0.74 U	0.57 J	0.88 J	0.90 J	0.52 J
Calcium	NC	NC	3930	4120	2840	12500	2280	2160	8900	5940	4010
Chromium, Hexavalent	1	22	< 2.7 U	< 2.6 UT	< 3.2 U	< 2.8 U	< 2.5 U	< 2.5 UT	< 2.5 U	< 3.2 U	< 2.6 U
Chromium, Total	30	36	15.5	16.4	26.2	21.5	14.0	16.9	22.7	26.5	18.9
Cobalt	NC	30	8.2 J	8.4 J	9.8 J	14.1	8.1 J	7.9 J	13.1	16.1	12.7
Copper	50	270	28.1	29.1	**90.7**	22.9	15.7	22.2	41.2	34.3	24.4
Iron	NC	2000	***18000***	***19700***	***23900***	***32400***	***23300***	***23300***	***32400***	***37800***	***28700***
Lead	63	400	34.2	36.5	**236**	14.1	12.4	20.1	46.5	35.8	17.8
Magnesium	NC	NC	3460	3630	3790	9160	3100	4330	5700	6780	5120
Manganese	1600	2000	432	441	547	683	500	893	698	775	619
Mercury	0.18	0.81	0.086	0.068	***1.6***	0.017 J	0.031	0.039	0.10	0.032	0.018 J
Nickel	30	140	18.9	19.3	25.6	28.7	15.4	19.6	26.8	**34.1**	23.9
Potassium	NC	NC	1300	1520	1620	3210	1040	1170 J	2410	3490	2280
Selenium	3.9	36	0.92 J	0.80 J	< 6.2 U	< 5.1 U	< 3.7 U	< 5.1 U	< 4.7 U	< 6.2 U	< 4.8 U
Silver	2	36	< 2.1 U	< 2.0 U	< 3.1 U	< 2.6 U	< 1.8 U	< 2.5 U	< 2.4 U	< 3.1 U	< 2.4 U
Sodium	NC	NC	106 J	113 J	< 1540 U	211 J	< 925 U	512 J	< 1180 U	163 J	< 1190 U
Thallium	NC	NC	< 4.1 U	0.86 J	< 6.2 U	< 5.1 U	0.86 J	< 5.1 U	< 4.7 U	< 6.2 U	< 4.8 U
Vanadium	NC	100	24.2	26.1	25.6	30.3	22.5	22.2	29.6	38.0	28.1
Zinc	109	2200	104	**112**	**211**	76.8	47.5	**112**	**160**	**141**	79.2

Notes:

Units: milligrams per kilogram or parts per million
NC: No Criteria
U: Not Detected
Estimated
J: Value
Duplicates: DUP1 duplicate of S2 and DUP2 duplicate of S4
Bold Values: Detection above Part 375 Unrestricted Use Soil Cleanup Objective
Bold Italicized Values: Detection above either Part 375 Residential Use Soil Cleanup Objective or CP-51 Residential Use Soil Cleanup Objective

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Table 5
Norlite Area Investigation
Surface Water Per- and Polyfluoroalkyl Substances (PFAS) Results - October and November 2020

Location Sample ID Sample Date Flow Condition		WATER 1 HFW1 10/30/2020 High Flow	WATER 1 LFW1 11/6/2020 Low Flow	WATER 2 HFW2 10/30/2020 High Flow	WATER 2 LFW2 11/6/2020 Low Flow	WATER 3 HFW3 10/30/2020 High Flow	WATER 3 LFW3 11/6/2020 Low Flow	WATER 4 HFW DUP 10/30/2020 High Flow	WATER 4 HFW4 10/30/2020 High Flow	WATER 4 LFW4 11/6/2020 Low Flow	WATER 5 LFW5 11/6/2020 Low Flow	WATER 6 LFW6 11/6/2020 Low Flow	WATER 7 DUP 11/6/2020 Low Flow	WATER 7 LFW7 11/6/2020 Low Flow	WATER 8 LFW8 11/6/2020 Low Flow
CHEMICAL NAME	Part 375 GV														
Perfluorooctanesulfonic acid (PFOS)	10	2.9	1.6 J	1.8 J	< 1.9 U	2.2	< 2.0 U	2.2	2.2	< 1.9 U	**12**	**12**	2.6	2.1	2.1
Perfluorooctanoic acid (PFOA)	10	1.8	1.7 J	1.9	1.1 J	1.8 J	1.1 J	2.0	2.1	3.9	0.97 J	1.0 J	5.1	5.6	5.3
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	< 4.6 U	< 4.7 U	< 4.7 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.6 U	< 4.7 U	< 4.6 U	< 4.6 U	< 4.6 U	< 4.7 U	< 4.9 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	< 4.6 U	< 4.7 U	< 4.7 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.6 U	< 4.7 U	< 4.6 U	< 4.6 U	< 4.6 U	< 4.7 U	< 4.9 U
Perfluorobutanesulfonic acid (PFBS)	100	2.6	2.2	2.7	2.0	2.2	2.4	2.9	2.5	2.4	0.71 J	0.56 J	**100**	**100**	**100**
Perfluorobutanoic acid (PFBA)	100	3.7 J	< 4.7 U	4.3 J	2.3 J	4.1 J	2.3 J	4.7 J	4.6	8.6	3.3 J	2.9 J	21	23	20
Perfluorodecanesulfonic Acid (PFDS)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorodecanoic acid (PFDA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorododecanoic acid (PFDoA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroheptanesulfonic acid (PFHpS)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroheptanoic acid (PFHpA)	100	1.2 J	0.73 J	1.3 J	0.59 J	1.4 J	0.59 J	1.9	1.9	5.6	1.1 J	0.86 J	10	11	11
Perfluorohexanesulfonic acid (PFHxS)	100	0.97 J	1.4 J	1.0 J	0.93 J	1.0 J	1.2 J	1.1 J	1.3 J	1.5 J	3.4	1.7 J	2.0	2.3	1.9
Perfluorohexanoic acid (PFHxA)	100	1.8	1.2 J	2.2	0.83 J	2.7	1.4 J	3.9	4.1	15	2.6	2.4	11	11	11
Perfluorononanoic acid (PFNA)	100	0.48 J	< 1.9 U	0.31 J	< 1.9 U	0.38 J	< 2.0 U	0.33 J	0.38 J	< 1.9 U	0.41 J	< 1.9 U	1.8 J	1.8 J	1.7 J
Perfluorooctanesulfonamide (FOSA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoropentanoic acid (PFPeA)	100	2.8	1.2 J	3.4	0.89 J	4.2	1.6 J	6.3	6.4	30	2.7	2.3	14	15	13
Perfluorotetradecanoic acid (PFTeA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorotridecanoic acid (PFTriA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroundecanoic acid (PFUnA)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	100	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2.0 U	< 1.9 U	< 1.8 U	1.9 UJ	< 1.8 U	< 1.9 U	< 1.9 U	1.9 UJ	< 1.9 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	100	< 4.6 U	< 4.7 U	< 4.7 U	< 4.7 U	< 4.9 U	< 4.9 U	2.7 J	2.6 J	33 J	< 4.6 U	< 4.6 U	< 4.6 U	4.7 UJ	< 4.9 U
Total Per- and Polyfluoroalkyl Substances (PFAS)	500	18.25	10.03	18.91	8.64	19.98	10.59	28.03	28.08	101.9	27.19	23.72	167.5	178.4	166

Notes:

Units: nanograms per liter or parts per trillion
U: Not Detected
J: Estimated Value
Duplicates: HFW Dup duplicate of HFW4 and DUP duplicate of LFW7
Bold Values: Detection above guidance values of 10 nanograms per liter for PFOS and PFOA or greater than 100 nanograms per liter for an individual analyte

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Table 5 Continued
Norlite Area Investigation
Surface Water Per- and Polyfluoroalkyl Substances (PFAS) Results - October and November 2020

Location Sample ID Sample Date Flow Condition		WATER PC1 LFPCW1 11/6/2020 Low Flow	WATER PC2 10/30/2020 High Flow	WATER PC2 11/6/2020 Low Flow	WATER PC3 HFPCW3 10/30/2020 High Flow	WATER PC3 11/6/2020 Low Flow	WATER PC4 10/30/2020 High Flow	WATER PC4 LFPCW4 11/6/2020 Low Flow	WATER SC1 High Flow	WATER SC1 LFSCW1 11/6/2020 Low Flow	WATER SC2 HFSCW2 10/30/2020 High Flow	WATER SC2 LFSCW2 11/6/2020 Low Flow
CHEMICAL NAME	Part 375 GV	[redacted]										
Perfluorooctanesulfonic acid (PFOS)	10	4.7	4.8	**21**	4.5	6.7	4.5	5.8	1.1 J	1.7 J	0.95 J	< 1.9 U
Perfluorooctanoic acid (PFOA)	10	6.6	3.2	6.5	4.0	4.4	3.4	4.1	1.8 J	1.8 J	1.4 J	1.6 J
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100	< 4.7 U	< 4.8 U	< 4.6 U	< 4.9 U	< 4.7 U	< 4.6 U	< 4.6 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.7 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100	< 4.7 U	< 4.8 U	< 4.6 U	< 4.9 U	< 4.7 U	< 4.6 U	< 4.6 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.7 U
Perfluorobutanesulfonic acid (PFBS)	100	2.7	2.3	2.9	2.3	2.9	2.0	2.6	1.8 J	1.1 J	0.72 J	0.75 J
Perfluorobutanoic acid (PFBA)	100	14	7.8	10	7.1	7.7	6.5	6.8	2.9 J	< 4.8 U	2.7 J	< 4.7 U
Perfluorodecanesulfonic Acid (PFDS)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorodecanoic acid (PFDA)	100	< 1.9 U	< 1.9 U	< 1.9 U	0.35 J	< 1.9 U	0.35 J	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorododecanoic acid (PFDoA)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroheptanesulfonic acid (PFHpS)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroheptanoic acid (PFHpA)	100	3.8	2.3	3.2	2.3	2.5	2.4	2.7	0.80 J	1.1 J	0.83 J	0.55 J
Perfluorohexanesulfonic acid (PFHxS)	100	3.7	2.3	5.1	2.8	3.8	2.5	3.7	< 1.9 U	0.58 J	< 1.9 U	< 1.9 U
Perfluorohexanoic acid (PFHxA)	100	9.9	5.1	7.6	5.8	6.4	4.7	5.3	1.4 J	1.2 J	1.1 J	0.64 J
Perfluorononanoic acid (PFNA)	100	0.63 J	0.52 J	0.80 J	0.41 J	0.33 J	0.39 J	< 1.8 U	0.35 J	0.27 J	0.34 J	< 1.9 U
Perfluorooctanesulfonamide (FOSA)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoropentanoic acid (PFPeA)	100	8.6	5.1	7.5	5.2	6.7	5.1	5.9	1.9	1.3 J	1.4 J	0.80 J
Perfluorotetradecanoic acid (PFTeA)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluorotridecanoic acid (PFTriA)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
Perfluoroundecanoic acid (PFUnA)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	100	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.8 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	100	< 4.7 U	< 4.8 U	< 4.6 U	< 4.9 U	< 4.7 U	< 4.6 U	< 4.6 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.7 U
Total Per- and Polyfluoroalkyl Substances (PFAS)	500	54.63	33.42	64.6	34.76	41.43	31.84	36.9	12.05	9.05	9.44	4.34

Notes:

Units:	nanograms per liter or parts per trillion
U:	Not Detected
J:	Estimated Value
Duplicates:	HFW Dup duplicate of HFW4 and DUP duplicate of LFW7
Bold Values:	Detection above guidance values of 10 nanograms per liter for PFOS and PFOA or greater than 100 nanograms per liter for an individual analyte

`

Table 6
Norlite Area Investigation
Water Per- and Polyfluoroalkyl Substances (PFAS) TOP Assay Results - November 2020

Location	WATER 4	WATER 4	WATER 7	WATER 7
Sample ID	LFW4	LFW4		
Sample Date	11/6/2020	11/6/2020	11/6/2020	
Flow Conditions	Low Flow	Low Flow	Low Flow	Low Flow
FRACTION	TOP_Post	TOP_Pre	TOP_Post	TOP_Pre
CHEMICAL_NAME				
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	< 50 U	< 50 U	< 50 U 11/6/2020	< 50 U
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	< 50 U	< 50 U LFW7	< 50 U LFW7	< 50 U
Perfluorobutanesulfonic acid (PFBS)	< 5.0 U	< 5.0 U	93	96
Perfluorobutanoic acid (PFBA)	27 B	8.9	58 B	21
Perfluorodecanesulfonic Acid (PFDS)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorodecanoic acid (PFDA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorododecanoic acid (PFDoA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluoroheptanesulfonic acid (PFHpS)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluoroheptanoic acid (PFHpA)	5.1	5.2	9.6	9.7
Perfluorohexanesulfonic acid (PFHxS)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorohexanoic acid (PFHxA)	18	15	13	11
Perfluorononanoic acid (PFNA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorooctanesulfonamide (FOSA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorooctanesulfonic acid (PFOS)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorooctanoic acid (PFOA)	< 5.0 U	5.0	6.1	5.8
Perfluoropentanoic acid (PFPeA)	31	26	16	14
Perfluorotetradecanoic acid (PFTeA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluorotridecanoic acid (PFTriA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Perfluoroundecanoic acid (PFUnA)	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	< 50 U	< 50 U	< 50 U	< 50 U
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	< 50 U	< 50 U	< 50 U	< 50 U

Notes:

Units: micrograms per kilogram or parts per billion
U: Not Detected
J: Estimated Value

Appendix A – Field Sampling Logs

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Division of Environmental Remediation
Central Office

Field Log

Site Code #: 401041	**Date:** 10/21/2020

Site Name: Norlite
Location: Albany/Cohoes
DEC Project Manager: Lynn Winterberger

	AM	PM
Weather	~~50~~ cloudy	Sunny
Temperature	50	70
Wind Direction	to west ~~[illegible]~~	Windy (southern)

Objective: obtain soil samples

Field Staff: Brian Jankauskas, Gerry Pratt, Steve Malsan, Eric Hart, Meghan Megaw, Jenelle Gaylord

Description of Inspection Activities and Discussions:

730 meet at SUNY East, discussed objective & health and safety
830 at 6 mile ~~creek~~ Waterworks park to obtain background samples

130 Gerry, Jenelle, and Eric went to Norlite to collect samples
Brian, Steve, ~~and~~ Meghan went to Saratoga Apts to collect samples.

700 Done for the day drive back to SUNY East

Health & Safety:
Level of protection: Level D, used nitrile gloves

Site Representative: Stephen Malsan **Date:** 10/21/20
Representative's Signature: [signature]

Date: 10/21/2020

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
PC1-soil-102120	~~42°41'49.565~~ 42°41'49.565 N	73°49'51.751 W	PFAS	0-6"	brown	moist, silty clay ~~moist~~	✓
PC2-soil-102120	42.68519003 N	73.78982954 W	PFAS	0-6"	brown	mostly silt some clay organics moist	✓
Soil 15 102120	42.74167322 N	73.71369471 W	PFAS (TCP) Metals	0-6"	brown	Clay w/ silt trace sand Moist	✓
Soil 14 102120	42.74580473 N	73.70931996 W	PFAS metals	0-4"	light brown	Silt w/ some clay (trace gravel + fine sand), dry refusal at 4"	✓
Soil 13 102120	42.74751773 N	73.70768159 W	PFAS metals MS/MSD	0-6"	brown	silt w/ clay trace gravel dry organics	✓
Soil 16 102120	42.76260021 N	73.70639562 N	PFAS metals	0-6"	brown	silt w/ clay trace gravel organics dry	✓
Soil 2 102120	42.76100097 N	73.70412233 W	PFAS metals Dup 1	0-6"	brown	clay w/ silt organics dry	✓
Soil 12 102120	42.75173317 N	73.71282429 W	PFAS metals	0-6"	brown	silt w/ some clay organics dry	✓ 2:55 pm collect
Soil 11 102120	42.75348835 N	73.71280382 W	PFAS metals	0-6"	brown	clay w/ trace silt organics dry	✓
Soil 1 102120	42.75804605 N	73.71672987 N	PFAS metals	0-6"	brown	clay w/ silt organics dry	✓ 4:30pm collect

Date: 10/21/2020

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
Soil 3 102120	42.75720798N	73.70284793W	PFAS Metals	0-6"	Dark Brown	0-3" Dark Brown Gravel w/ silt trace clay Fill 3-6" Light Brown w/ Med Gravel Angular	✓
Soil 4 10 21 20	42.75504483 N	73.70223016 W	PFAS Metals Dup 2	0-6	Brown	Clay w/ silt ~~little~~ (some) organics, stiff	✓

Date: 10-21-2020

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
Soil 8a 102120	N42° 45' 9.875"	W73° 42' 4.411"	PFAS, metals	0"-2"	Brown	silt, ~~some~~ trace sand, organics, dry	✓
Soil 8b 102120	↑	↑	PFAS top assay, metals	0"-6"	Brown	silt, trace sand, organics, dry top assay location	✓
Equipment Blank 102120	–	–	PFAS, metals	—	—	Stainless steel bowl and spoon	—
Soil 6a 102120	~~N 42° 45' 14.379"~~ BFS ~~W 73° 42' 4.494"~~ BFS N 42° 45' 14.379"	W 73° 42' 4.494"	PFAS, metals	0"-2"	Brown	silt, some clay, organics, dry	✓
Soil 6b 102120	↑	↑	PFAS, metals	0"-6"	Brown	silt, some clay, organics, dry	✓
Soil 7a 102120	N 42° 45' 11.674" ~~W 73°~~ BFS	W 73° 42' 4.183"	PFAS, metals	0"-2"	Brown	silt, trace sand, trace clay, organics, dry	✓
Soil 7b 102120	↑	↑	PFAS, metals	0"-6"	Brown	silt, trace clay, trace sand, organics, dry	✓
Soil 9a 102120	N42° 45' 9.875"	W73° 42' 4.411"	PFAS, metals	0"-2"	Brown	silt, trace sand, trace clay, organics, dry	✓
Soil 9b 102120	↑	↑	PFAS, metals ms, MSD	0"-6"	Brown	silt, trace sand, trace clay organics, dry	✓
Field Blank 102120	—	—	PFAS	—	—	Saratoga Apts.	—

Date: 10/21/20

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
soil 5 102120	N42°45'23.853"	W73°41'55.860"	PFAS, metals	0"-6"	Brown	silt with clay, some stones and brick chips, moist, organics	✓
Soil 10 102120	N42°44'58.877"	W73°41'57.812"	PFAS, metals	0"-6"	Brown	silt with stones and some sand, organics, dry	

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Division of Environmental Remediation
Central Office

Field Log

Site Code #: 401041	**Date:** 10/30/2020

Site Name: Norlite
Location: Various-Cohoes
DEC Project Manager: Gerald Pratt

	AM	**PM**
Weather	snow/freezing rain	overcast
Temperature	32°	45°
Wind Direction	North	

Objective: high flow water grab samples

Description of Inspection Activities and Discussions:

PFAS water sampling from various streams in Cohoes and Albany.

Health & Safety:
Level of protection: Level D, used nitrile gloves

Site Representative: Stephen Malson
Representative's Signature: [signature]

Date: 10/30/2020

Date: 10/30/2020

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
HFPCW1-WATER-103020	42°41.1390 N	73°47.3680 W	Water	surface	Clear	high flow, grab	X
HF W2 10302020	42.75861844 N	73.70615858 W	Water	Surface	Clear 15.8	shale tunnel/cave high flow grab MS/MSD generic point 1	X
HF W3 10302020	42.75528325 N	73.7055540 W	Water	Surface	clear 15.1	high flow grab / upstream of sample outfall 75 ft 003 generic point 2	X
HF W4 10302020	42 ~~.75528325~~ .75436525 N	73.70168713 ~~73.70555~~	Water	Surface	Clear 14.3	high flow grab Water 4103020 Stream reach between RR/Saratoga	X

Date: 10/30/2020

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
HFSCW2-Water-10302020	42°56'58.455" N	73°40'47.019" W	PFAS: standard list	surface	slightly turbid	high flow, grab	X
HFSC2-Water-10302020	42°56'15.246" N	73°39'28.741" W	PFAS, standard list	surface	very slightly turbid	high flow, grab, soap bubbles	X
HFW1-Water-10302020	42°45'56.634" N	73°43'53.867" W	PFAS, standard list	surface	very slightly turbid	high flow, grab, soap bubbles	X
HFPC3N3-Water-10302020	42°40'17.218" N	73°45'30.603" W	PFAS, standard list	surface	Clear	high flow, bottles in water	X
HFPCW4-Water-10302020	42°39'34.422" N	73°44'17.614" W	PFAS, standard list	surface	slightly turbid	high flow, grab	X

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Division of Environmental Remediation
Central Office

Field Log

Site Code #: 401041	Date: 11-6-20

Site Name: Norlite
Location: Various Cohoes, Albany
DEC Project Manager: Steve Malsan

	AM	PM
Weather	Clear	
Temperature	50°	
Wind Direction	West	

Objective: Low Flow surface water sampling for PFAS analysis.

Description of Inspection Activities and Discussions:

Note flow conditions, turbidity,

Health & Safety:
Level of protection: Level D, used nitrile gloves

Site Representative: Stephen Malsan
Representative's Signature: [signature]

Date: 11/6/20

Date: 11-6-20 Norlite

Sample Log

Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
LFWater2 11062020 940			PFAS	Surface	Clear	Outfall tunnel, Lowflow Turb 2.76	✓
LFWater3 11062020: 1000			PFAS	Surface	Clear	Onsite Stream location turb 2.92? Adjacent to Conservation Rd	✓
LF Water 6 11062020: 10:35	42°45'17.035 N	73°42'24.740 W	PFAS	Surface	clear	Pond sample from pump platform Turb: 9.72 MS/MSD	✓
LF Water 5 11062020: 11:10am	42°45'14.370 N	73°42'22.831 W	PFAS	Surface	clear	Pond Sample South east corner pit adjacent to access road Turb: 1.28 Pull sample 10ft offshore	✓
LF Water 4 11062020: 11:40am			PFAS	Surface	clear	Onsite stream location adjacent to railroad Turb: 2.03 TOP	✓
LF Water 7 11062020: 12:15	~~42°45'16.593 N~~ 42°45'05.604 N	~~73°42'23.874 W~~ 73°42'11.856 W	PFAS	Surface	clear	North end of pond pull sample approximately 10 ft offshore Turb: 2.03	✓
LF Water 8 11062020: 12:50	42°44'57.485 N	73°42'12.233 W	PFAS	Surface	clear	South end of pond pull sample approximately 10ft offshore appears to be a fishing location	✓

Date: 11-6-20 Norlite

Sample Log

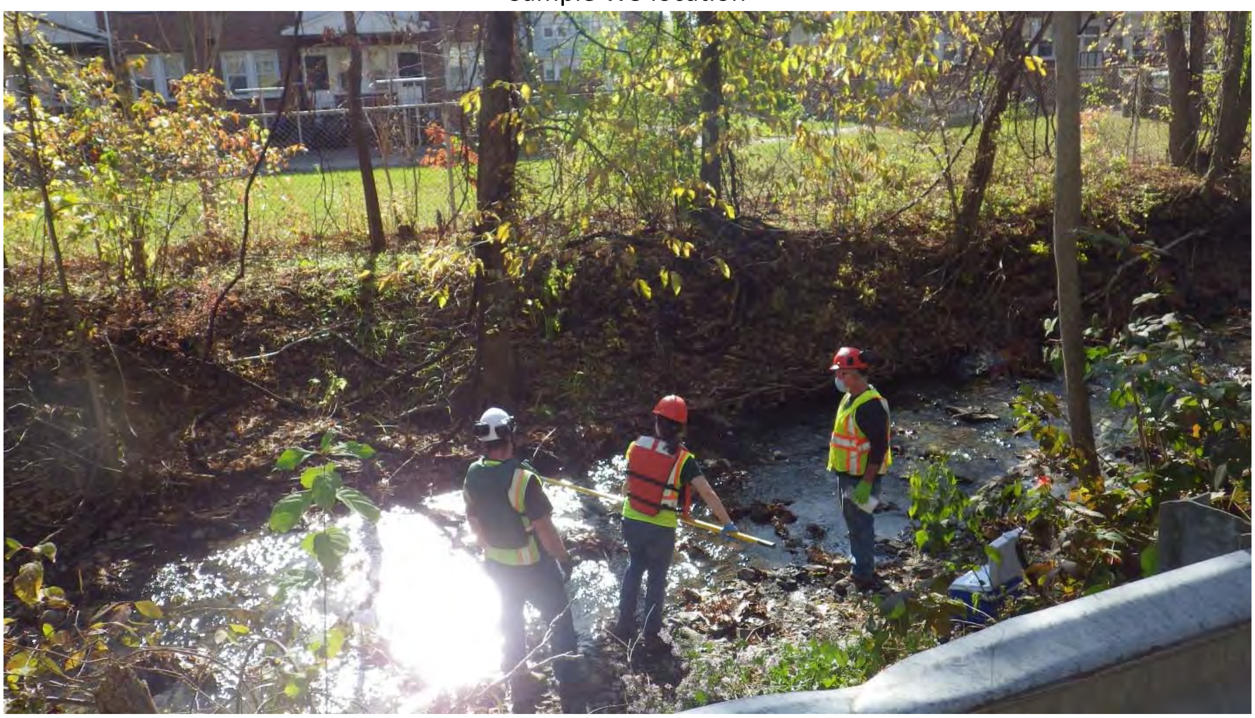
Sample ID	Latitude	Longitude	Analysis	Depth (in)	Color	Description	Photo
LFSCW2-Water-11062020	42°56'58.455" N	73°40'47.019" W	PFAS, Standard 21 list	surface	clear	grab sample, slow moving water, low flow	X
LFSCW3-water-11062020	42°56'15.246" N	73°39'28.741" W	PFAS, standard list	Surface	Clear	low flow, grab sample, bottles in water	X
LFWI-water 11062020	42°45'56.634" N	73°43'53.867" W	PFAS standard list	surface	Clear	low flow, grab sample	X
LFPCW1-water-11062020	42.69722440° N	73.83131741° W	PFAS, standard list	Surface	Clear	low flow, grab sample	X
LFPCW2-water-11062020			PFAS, standard list	surface	Clear	low flow, grab sample	X
LFPCW3-Water-11062020	42°40'17.218"N	73°45'30.603" W	PFAS, standard list	surface	Clear	low flow, grab sample, bottles directly in water	X
LFPCW3-water-11062020	42°39'34.922" N	73°44'17.614" W	PFAS, standard list	surface	Clear	low flow, grab sample	X

Appendix B – Photos

Sample W2 location – note proximity of small waterfall

Sample W2 location – note proximity of small waterfall

Sample W3 location



Sample W4 location

Sample W5 location

Sample W5 location – close up

Sample W6 location

Sample W6 location – close up

Sample W7 location

Sample W8 location

Sample PC2 Water location

Sample SC2 location

Sample SC1 location, pumpkins floating in water

Sample SC1 location – close up

Sample W1 location – low flow conditions

Sample W1 location - high flow conditions

Sample PC2 location

Sample PC3 location

Sample PC4 location

Sample PC4 location – close up

Soil 1 location

Soil 2 location

Soil 3 location

Soil 4 location

Soil 5 location

Soil 6a and 6b location

Soil 7a and 7b location

Soil 8a and 8b location

Soil 9a and 9b location

Soil 10 location

Soil 11 location

Soil 12 location

Soil 13 location

Soil 15 location

Soil 16 location

Soil PC1 location

Soil PC2 location

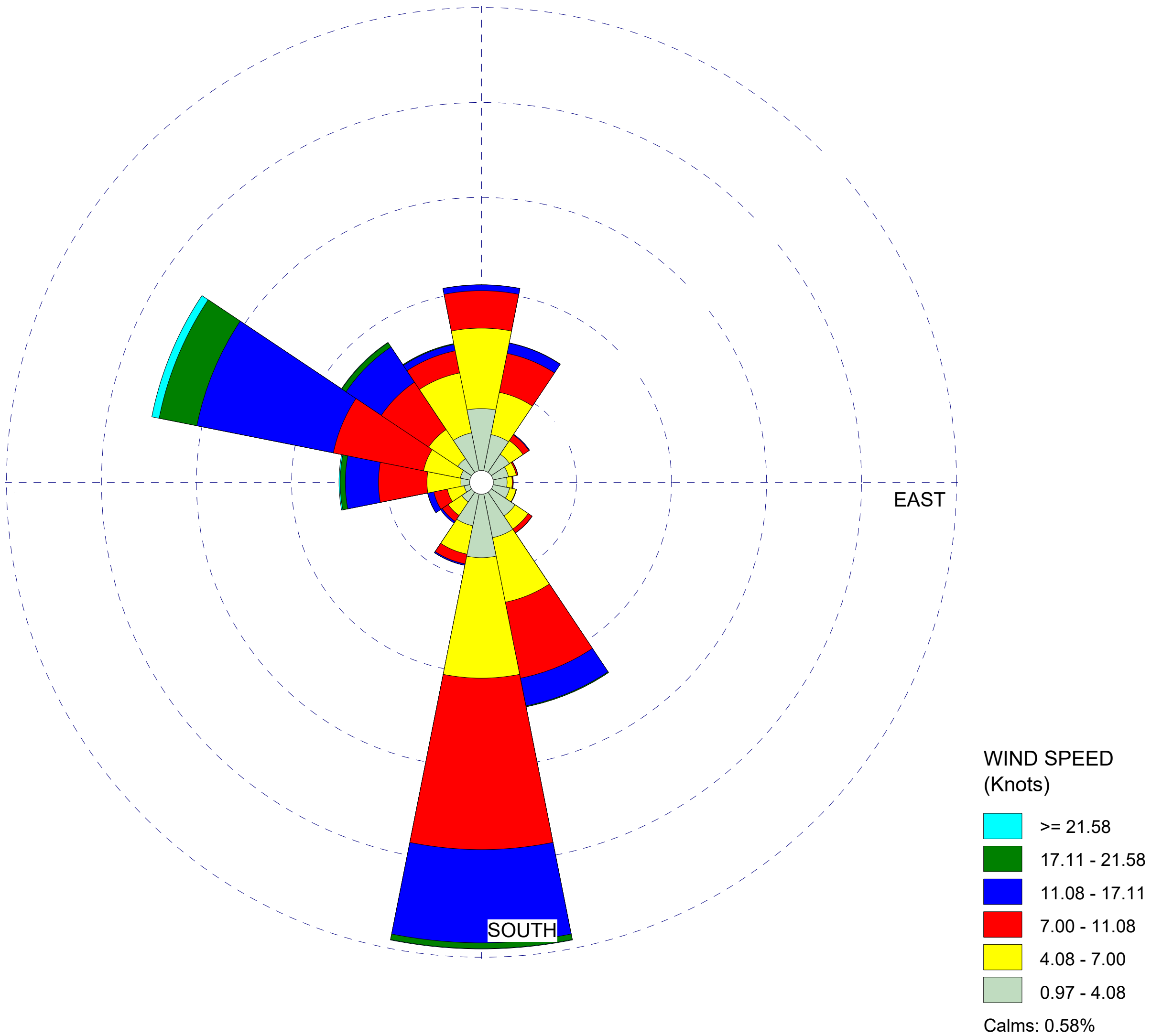
Appendix C – Meteorological Data

WIND ROSE PLOT:

KALB- Albany International Airport, Colonie, NY
2015-2019

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2015 - 00:00** **End Date: 12/31/2019 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.58%**	TOTAL COUNT: **43796 hrs.**	
	AVG. WIND SPEED: **7.29 Knots**	DATE: **8/21/2020**	PROJECT NO.:

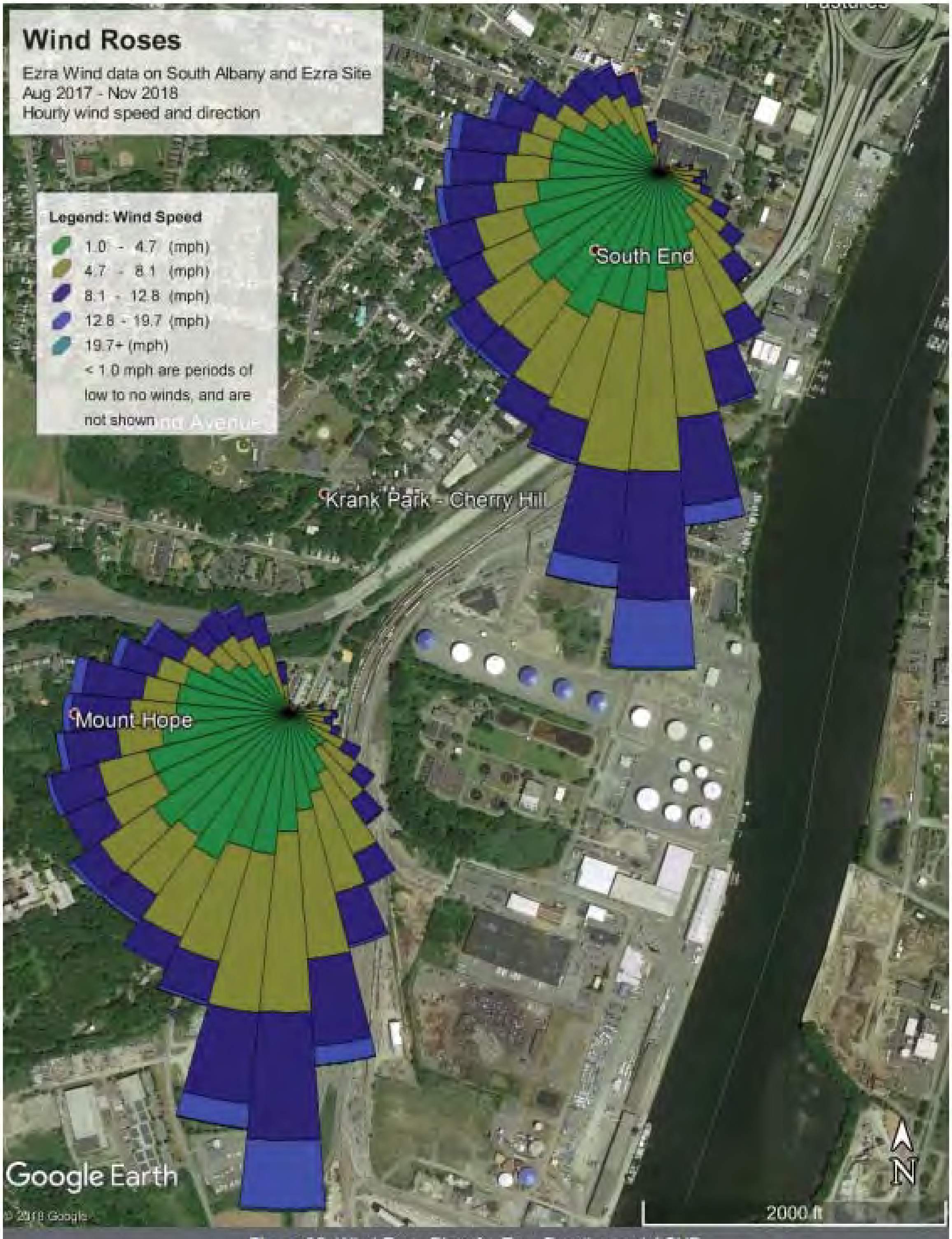


Figure 22. Wind Rose Plots for Ezra Prentice and ACHD

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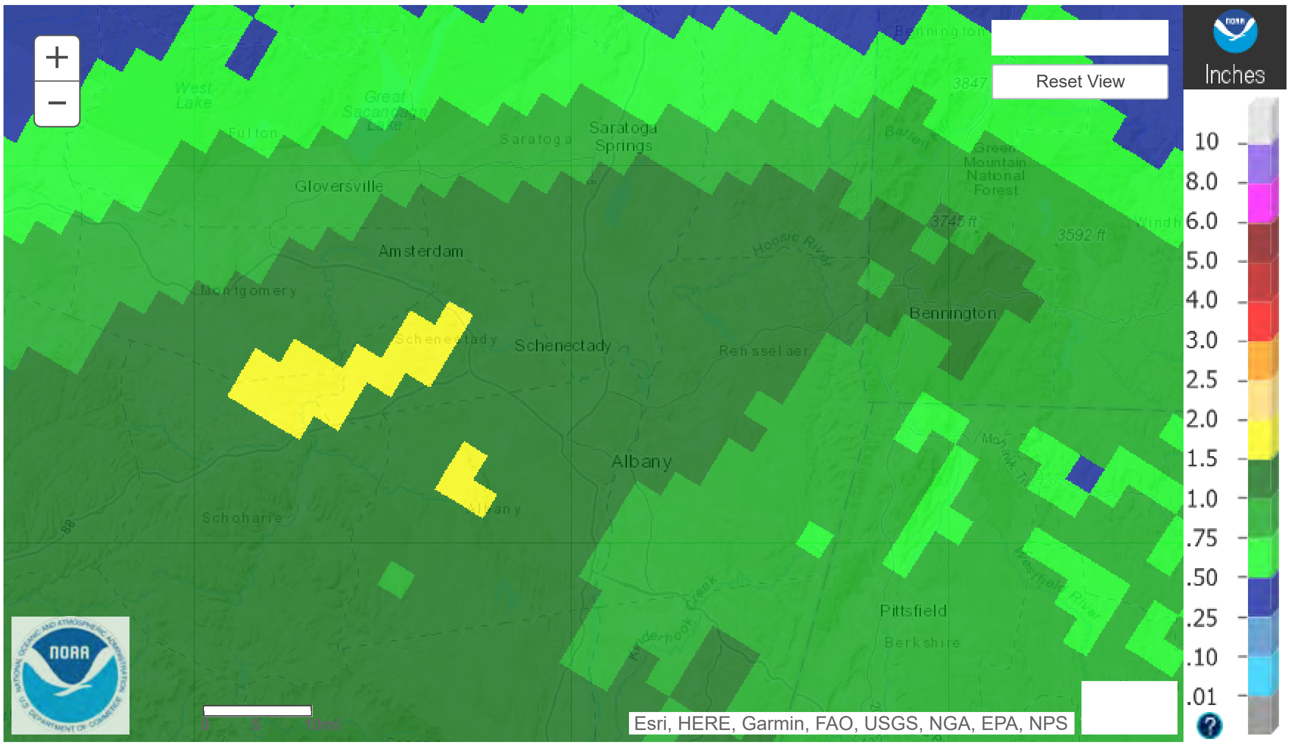

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Timeframe

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Archive Data:
- ○ Yearly
- ○ Monthly
- ○ Daily

Time Range:
- October 30, 2020 - Today
- October 30, 2020 - Last 7 Days
- October 30, 2020 - Last 14 Days
- October 30, 2020 - Last 30 Days

Product

Observed

Units

- ◉ Imperial
- ○ Metric

Mouse Location

Lat: 42.856
Lon: -73.490

Map Overlays

- Precipitation
- County ☐
- State ☐
- River Forecast Center ☐
- Weather Forecast Office ☐

Location

Full Conus

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Data Availability

Data for the entire country are usually available by 12:30 pm Eastern Time (9:30 am Pacific Time).

Hourly Precipitation (East and Central US) - Data Documentation

Ask questions about the Precipitation Analysis website

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US Dept of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
1325 East West Highway
Silver Spring, MD 20910
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Climatological Report (Daily)

560
CDUS41 KALY 302045
CLIALB

CLIMATE REPORT
NATIONAL WEATHER SERVICE ALBANY NY
445 PM EDT FRI OCT 30 2020

....

...THE ALBANY NY CLIMATE SUMMARY FOR OCTOBER 30 2020...
VALID TODAY AS OF 0400 PM LOCAL TIME.

CLIMATE NORMAL PERIOD: 1981 TO 2010
CLIMATE RECORD PERIOD: 1874 TO 2020

WEATHER ITEM	OBSERVED VALUE	TIME (LST)	RECORD VALUE	YEAR	NORMAL VALUE	DEPARTURE FROM NORMAL	LAST YEAR
TEMPERATURE (F)							
TODAY							
MAXIMUM	37	12:31 AM	80	1946	54	-17	63
MINIMUM	29	9:09 AM	20	1969	36	-7	57
AVERAGE	33				45	-12	60
PRECIPITATION (IN)							
TODAY	0.21		1.67	1917	0.11	0.10	0.01
MONTH TO DATE	3.13				3.56	-0.43	6.72
SINCE SEP 1	5.76				6.86	-1.10	8.95
SINCE JAN 1	29.67				33.01	-3.34	37.93
SNOWFALL (IN)							
TODAY	1.2 R		0.1	1925	0.1	1.1	0.0
MONTH TO DATE	1.2				0.3	0.9	0.0
SINCE SEP 1	1.2				0.3	0.9	0.0
SINCE JUL 1	1.2				0.3	0.9	0.0
SNOW DEPTH	1						
DEGREE DAYS							
HEATING							
TODAY	32				20	12	5
MONTH TO DATE	456				459	-3	355
SINCE SEP 1	632				603	29	430
SINCE JUL 1	657				626	31	432
COOLING							
TODAY	0				0	0	0
MONTH TO DATE	0				0	0	4
SINCE SEP 1	25				51	-26	48

```
  SINCE JAN 1    815                      594    221      771
.................................................................


WIND (MPH)
  HIGHEST WIND SPEED     18   HIGHEST WIND DIRECTION     N (360)
  HIGHEST GUST SPEED     26   HIGHEST GUST DIRECTION     N (360)
  AVERAGE WIND SPEED     11.0


SKY COVER
  AVERAGE SKY COVER 1.0


RELATIVE HUMIDITY (PERCENT)
 HIGHEST   100         12:00 AM
 LOWEST     82          3:00 PM
 AVERAGE    91

..........................................................


THE ALBANY NY CLIMATE NORMALS FOR TOMORROW
           NORMAL                 RECORD    YEAR
 MAXIMUM TEMPERATURE (F)   54        75      2019
 MINIMUM TEMPERATURE (F)   35        18      1988


SUNRISE AND SUNSET
OCTOBER 30 2020.......SUNRISE   7:27 AM EDT   SUNSET   5:50 PM EDT
OCTOBER 31 2020.......SUNRISE   7:29 AM EDT   SUNSET   5:48 PM EDT


-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

The U.S. Naval Observatory (USNO) data is currently unavailable. The links provided are from other US Government sources. When USNO data is returned to service, the links will be updated.

Select Other Date

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Daily)

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324
CDUS41 KALY 292058
CLIALB

CLIMATE REPORT
NATIONAL WEATHER SERVICE ALBANY NY
458 PM EDT THU OCT 29 2020

...................................

...THE ALBANY NY CLIMATE SUMMARY FOR OCTOBER 29 2020...
VALID TODAY AS OF 0400 PM LOCAL TIME.

CLIMATE NORMAL PERIOD: 1981 TO 2010
CLIMATE RECORD PERIOD: 1874 TO 2020


WEATHER ITEM   OBSERVED TIME   RECORD YEAR NORMAL DEPARTURE LAST
        VALUE          (LST)  VALUE       VALUE  FROM      YEAR
                      NORMAL
...................................................................
TEMPERATURE (F)
 TODAY
  MAXIMUM         44  11:15 AM  77    1918  55    -11       64
                 1946
  MINIMUM         39   5:14 AM  19    1940  36      3       53
                 1969
  AVERAGE         42                        45     -3       59

PRECIPITATION (IN)
  TODAY            0.58          1.59 2003   0.12   0.46      T
  MONTH TO DATE    2.47                      3.45  -0.98     6.71
  SINCE SEP 1      5.10                      6.75  -1.65     8.94
  SINCE JAN 1     29.01                     32.90  -3.89    37.92

SNOWFALL (IN)
  TODAY            0.0           3.8  2011   0.0    0.0      0.0
  MONTH TO DATE    0.0                       0.2   -0.2      0.0
  SINCE SEP 1      0.0                       0.2   -0.2      0.0
  SINCE JUL 1      0.0                       0.2   -0.2      0.0
  SNOW DEPTH       0

DEGREE DAYS
 HEATING
  TODAY           23                        20      3        6
  MONTH TO DATE  423                       439    -16      350
  SINCE SEP 1    599                       583     16      425
  SINCE JUL 1    624                       606     18      427

 COOLING
  TODAY            0                         0      0        0
```

```
  MONTH TO DATE      0                          0      0        4
   SINCE SEP 1      25                         51    -26       48
   SINCE JAN 1     815                        594    221      771
.................................................................


WIND (MPH)
  HIGHEST WIND SPEED      9   HIGHEST WIND DIRECTION     N (360)
  HIGHEST GUST SPEED     12   HIGHEST GUST DIRECTION     N (10)
  AVERAGE WIND SPEED      2.1


SKY COVER
  AVERAGE SKY COVER 1.0


RELATIVE HUMIDITY (PERCENT)
 HIGHEST   100         12:00 AM
 LOWEST     96         10:00 AM
 AVERAGE    98

.........................................................


THE ALBANY NY CLIMATE NORMALS FOR TOMORROW
           NORMAL                RECORD    YEAR
 MAXIMUM TEMPERATURE (F)   54        80      1946
 MINIMUM TEMPERATURE (F)   36        20      1969


SUNRISE AND SUNSET
OCTOBER 29 2020.......SUNRISE   7:26 AM EDT   SUNSET   5:51 PM EDT
OCTOBER 30 2020.......SUNRISE   7:27 AM EDT   SUNSET   5:50 PM EDT


-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

The U.S. Naval Observatory (USNO) data is currently unavailable. The links provided are from other US Government sources. When USNO data is returned to service, the links will be updated.

Select Other Date

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - http://www.ncdc.noaa.gov.

Climatological Report (Daily)

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960
CDUS41 KALY 300625
CLIALB

CLIMATE REPORT
NATIONAL WEATHER SERVICE ALBANY NY
225 AM EDT FRI OCT 30 2020

...................................

...THE ALBANY NY CLIMATE SUMMARY FOR OCTOBER 29 2020...

CLIMATE NORMAL PERIOD: 1981 TO 2010
CLIMATE RECORD PERIOD: 1874 TO 2020


WEATHER ITEM   OBSERVED TIME   RECORD YEAR NORMAL DEPARTURE LAST
       VALUE           (LST)  VALUE       VALUE  FROM      YEAR
                      NORMAL
...................................................................
TEMPERATURE (F)
 YESTERDAY
  MAXIMUM         44  11:15 AM  77    1918  55    -11       64
                 1946
  MINIMUM         37  11:59 PM  19    1940  36      1       53
                 1969
  AVERAGE         41                        45     -4       59

PRECIPITATION (IN)
  YESTERDAY        1.03          1.59 2003   0.12   0.91      T
  MONTH TO DATE    2.92                      3.45  -0.53     6.71
  SINCE SEP 1      5.55                      6.75  -1.20     8.94
  SINCE JAN 1     29.46                     32.90  -3.44    37.92

SNOWFALL (IN)
  YESTERDAY        0.0           3.8  2011   0.0    0.0      0.0
  MONTH TO DATE    0.0                       0.2   -0.2      0.0
  SINCE SEP 1      0.0                       0.2   -0.2      0.0
  SINCE JUL 1      0.0                       0.2   -0.2      0.0
  SNOW DEPTH       0

DEGREE DAYS
 HEATING
  YESTERDAY       24                        20      4        6
  MONTH TO DATE  424                       439    -15      350
  SINCE SEP 1    600                       583     17      425
  SINCE JUL 1    625                       606     19      427

 COOLING
  YESTERDAY        0                         0      0        0
  MONTH TO DATE    0                         0      0        4
```
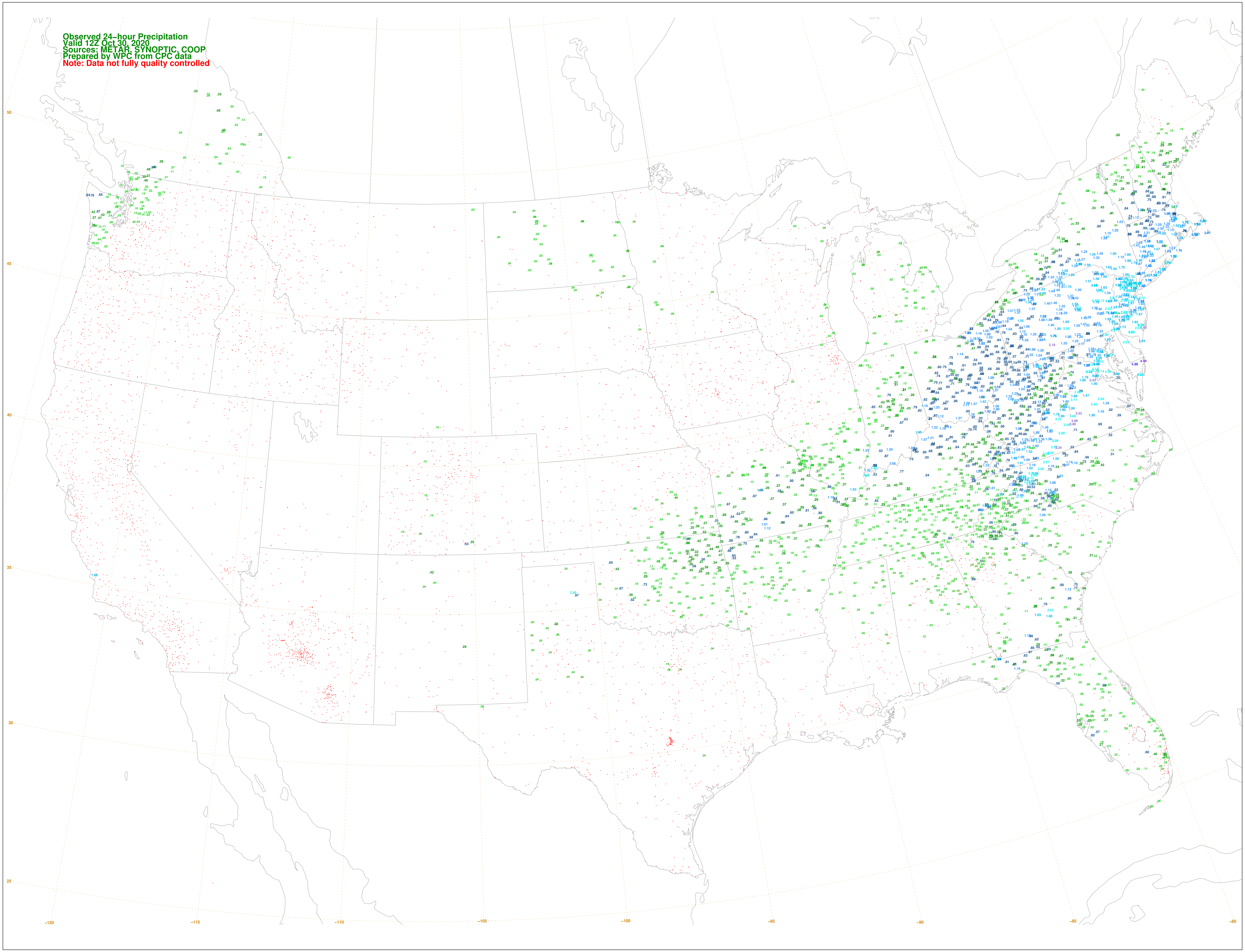

```
  SINCE SEP 1      25                          51    -26       48
   SINCE JAN 1    815                         594    221      771
.................................................................


WIND (MPH)
  HIGHEST WIND SPEED     17   HIGHEST WIND DIRECTION     N (360)
  HIGHEST GUST SPEED     24   HIGHEST GUST DIRECTION     N (340)
  AVERAGE WIND SPEED      5.2


SKY COVER
  AVERAGE SKY COVER 1.0


RELATIVE HUMIDITY (PERCENT)
 HIGHEST   100         12:00 AM
 LOWEST     96         10:00 AM
 AVERAGE    98

..........................................................


THE ALBANY NY CLIMATE NORMALS FOR TODAY
           NORMAL                 RECORD    YEAR
 MAXIMUM TEMPERATURE (F)   54        80      1946
 MINIMUM TEMPERATURE (F)   36        20      1969


SUNRISE AND SUNSET
OCTOBER 30 2020.......SUNRISE   7:27 AM EDT   SUNSET   5:50 PM EDT
OCTOBER 31 2020.......SUNRISE   7:29 AM EDT   SUNSET   5:48 PM EDT


-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.
```

The U.S. Naval Observatory (USNO) data is currently unavailable. The links provided are from other US Government sources. When USNO data is returned to service, the links will be updated.


Observed 24-hour Precipitation
Valid 12Z Oct 30, 2020
Sources: METAR, SYNOPTIC, COOP
Prepared by WPC from CPC data
Note: Data not fully quality controlled
50
45
40
35
30
25
-120
-115
-110
-105
-100
-95
-90
-85
-80

Appendix D – Summary Statistics and Data Comparison Figures

Appendix D – Summary Statistics Table and Data Comparison Figures

CONTAMINANT	SUBSET	MDL		RDL		OBS	QUAL	QUANT	DET FREQ (%)		CONC (ppb)	
		MIN	MAX	MIN	MAX				QUAL	QUANT	MIN	MAX
PFBA	**FULL NL**	0.034	0.040	0.240	0.290	16	16	7	100%	44%	0.270	0.900
	UW NL	0.034	0.038	0.240	0.270	6	6	3	100%	50%	0.270	0.900
	DW NL	0.034	0.040	0.240	0.290	10	10	4	100%	40%	0.340	0.590
	PC	0.033		0.240		2	2	***1***	100%	50%	0.540	
PFPeA	**FULL NL**	0.093	0.110	0.240	0.290	16	12	4	75%	25%	0.280	1.60
	UW NL	0.093		0.240		6	4	***1***	67%	17%	1.60	
	DW NL	0.093	0.110	0.240	0.290	10	8	3	80%	30%	0.280	0.370
	PC	NA				2	2	***0***	100%	0%	NA	
PFHxA	**FULL NL**	0.050	0.061	0.240	0.290	16	16	4	100%	25%	0.270	1.10
	UW NL	0.050	0.052	0.240	0.250	6	6	2	100%	33%	0.270	1.10
	DW NL	0.051	0.061	0.240	0.290	10	10	2	100%	20%	0.280	0.320
	PC	NA				2	2	***0***	100%	0%	NA	
PFHpA	**FULL NL**	0.035	0.042	0.240	0.290	16	16	3	100%	19%	0.290	1.00
	UW NL	0.035		0.240		6	6	***1***	100%	17%	1.00	
	DW NL	0.038	0.042	0.260	0.290	10	10	2	100%	20%	0.290	0.300
	PC	NA				2	2	***0***	100%	0%	NA	
PFOA	**FULL NL**	0.100	0.130	0.240	0.300	16	15	14	94%	88%	0.290	1.10
	UW NL	0.100	0.130	0.240	0.300	6	6	6	100%	100%	0.290	1.10
	DW NL	0.100	0.120	0.240	0.290	10	9	8	90%	80%	0.290	0.950
	PC	0.100	0.140	0.240	0.330	2	2	2	100%	100%	0.630	0.750
PFNA	**FULL NL**	0.043	0.055	0.240	0.300	16	15	9	94%	56%	0.290	2.40
	UW NL	0.043	0.055	0.240	0.300	6	6	4	100%	67%	0.350	1.20
	DW NL	0.043	0.052	0.240	0.290	10	9	5	90%	50%	0.290	2.40
	PC	0.043		0.240		2	2	***1***	100%	50%	0.250	
PFDA	**FULL NL**	0.026	0.033	0.240	0.300	16	15	8	94%	50%	0.270	2.10
	UW NL	0.026	0.033	0.240	0.300	6	6	3	100%	50%	0.270	2.10
	DW NL	0.027	0.032	0.240	0.290	10	9	5	90%	50%	0.270	0.880
	PC	0.036		0.330		2	2	***1***	100%	50%	0.370	
PFUnA	**FULL NL**	0.043	0.052	0.240	0.290	16	15	4	94%	25%	0.280	1.80
	UW NL	0.043		0.240		6	6	***1***	100%	17%	0.860	
	DW NL	0.043	0.052	0.240	0.290	10	9	3	90%	30%	0.280	1.80
	PC	NA				2	2	***0***	100%	0%	NA	
PFDoA	**FULL NL**	0.081	0.081	0.240	0.240	16	9	2	56%	13%	0.280	0.350
	UW NL	0.081		0.240		6	3	***1***	50%	17%	0.280	
	DW NL	0.081		0.240		10	6	***1***	60%	10%	0.350	
	PC	NA				2	***0***	***0***	0%	0%	NA	
PFTriA/PFTrDA	**FULL NL**	0.061		0.24		16	6	***1***	38%	6%	0.26	
	UW NL	NA				6	3	***0***	50%	0%	NA	
	DW NL	0.061		0.24		10	3	***1***	30%	10%	0.26	
	PC	NA				2	***0***	***0***	0%	0%	NA	

ABBREVIATIONS: MDL = Method Detection Limit; RDL = Reporting DL; OBS = # of Observations; QUANT = Quantitative detections; QUAL = Qualitative detections; DET FREQ = Detection Frequency; CONC (ppb) = Concentration (parts per billion); MIN = Minimum value; MAX = Maximum value; NL = Norlite; UW = Upwind; DW = Downwind; and PC = Patroon Creek

Table D1 – Summary Statistics

CONTAMINANT	SUBSET	MDL		RDL		OBS	QUAL	QUANT	DET FREQ (%)		CONC (ppb)	
		MIN	MAX	MIN	MAX				QUAL	QUANT	MIN	MAX
PFTA	FULL NL	NA				16	4	0	25%	0%	NA	
	UW NL	NA				6	1	0	17%	0%	NA	
	DW NL	NA				10	3	0	30%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	
PFBS	FULL NL	NA				16	10	0	63%	0%	NA	
	UW NL	NA				6	2	0	33%	0%	NA	
	DW NL	NA				10	8	0	80%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	
PFHxS	FULL NL	0.038		0.250		16	4	1	25%	6%	1.50	
	UW NL	0.038		0.250		6	1	1	17%	17%	1.50	
	DW NL	NA				10	3	0	30%	0%	NA	
	PC	NA				2	2	0	100%	0%	NA	
PFHpS	FULL NL	NA				16	1	0	6%	0%	NA	
	UW NL	NA				6	1	0	17%	0%	NA	
	DW NL	NA				10	0	0	0%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	
PFOS	FULL NL	0.240	0.300	0.600	0.760	16	15	5	94%	31%	0.650	9.80
	UW NL	0.240	0.300	0.600	0.760	6	6	3	100%	50%	0.650	9.80
	DW NL	0.240	0.290	0.600	0.720	10	9	2	90%	20%	0.650	1.40
	PC	0.240	0.330	0.590	0.830	2	2	2	100%	100%	1.30	6.00
PFDS	FULL NL	0.047		0.240		16	4	1	25%	6%	5.70	
	UW NL	NA				6	0	0	0%	0%	NA	
	DW NL	0.047		0.240		10	4	1	40%	10%	5.70	
	PC	NA				2	1	0	50%	0%	NA	
FOSA	NON DETECTIONS FOR ALL SAMPLE RESULTS											
MeFOSAA	NON DETECTIONS FOR ALL SAMPLE RESULTS											
NetFOSAA	FULL NL	NA				16	1	0	6%	0%	NA	
	UW NL	NA				6	1	0	17%	0%	NA	
	DW NL	NA				10	0	0	0%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	
6:2 FTS	FULL NL	NA				16	1	0	6%	0%	NA	
	UW NL	NA				6	1	0	17%	0%	NA	
	DW NL	NA				10	0	0	0%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	
8:2 FTS	FULL NL	NA				16	1	0	6%	0%	NA	
	UW NL	NA				6	1	0	17%	0%	NA	
	DW NL	NA				10	0	0	0%	0%	NA	
	PC	NA				2	0	0	0%	0%	NA	

ABBREVIATIONS: MDL = Method Detection Limit; RDL = Reporting DL; OBS = # of Observations; QUANT = Quantitative detections; QUAL = Qualitative detections; DET FREQ = Detection Frequency; CONC (ppb) = Concentration (parts per billion); MIN = Minimum value; MAX = Maximum value; NL = Norlite; UW = Upwind; DW = Downwind; and PC = Patroon Creek

Table D1 Continued – Summary Statistics

Upwind/Downwind Figures PFAS:

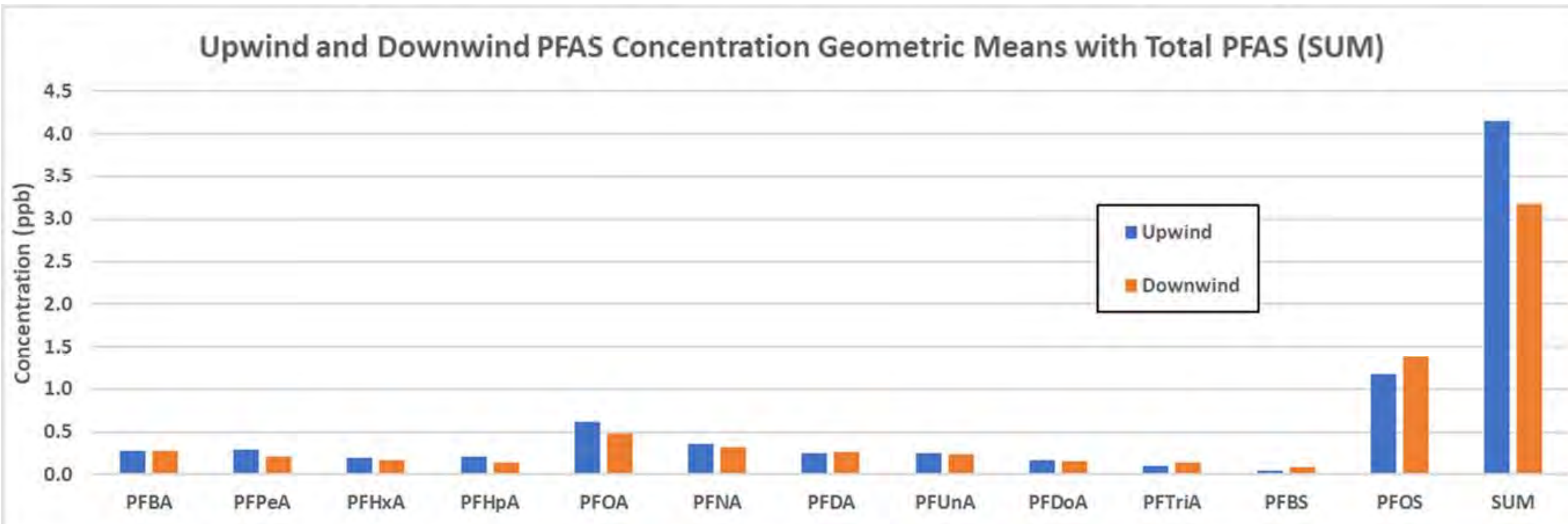


Figure D1. – Geometric means of all quantitative and qualitative PFAS samples detected including total PFAS (sum).

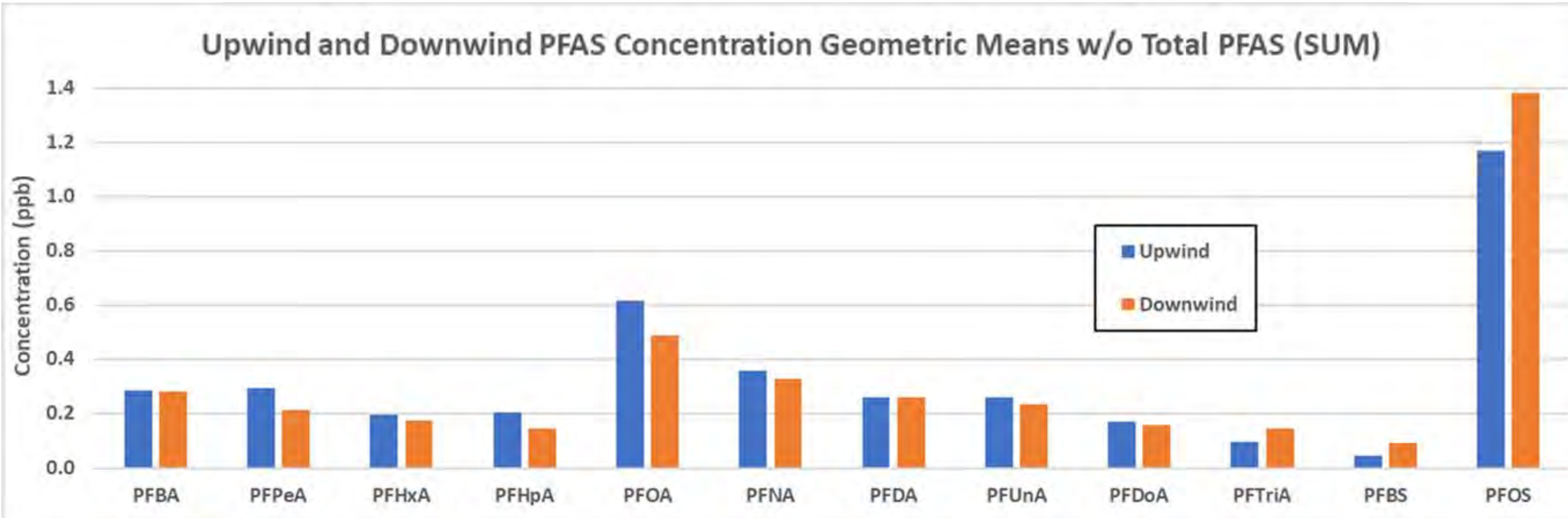


Figure D2 – Geometric means of all quantitative and qualitative PFAS samples detected without the total PFAS (sum).

Upwind/Downwind figures metals:

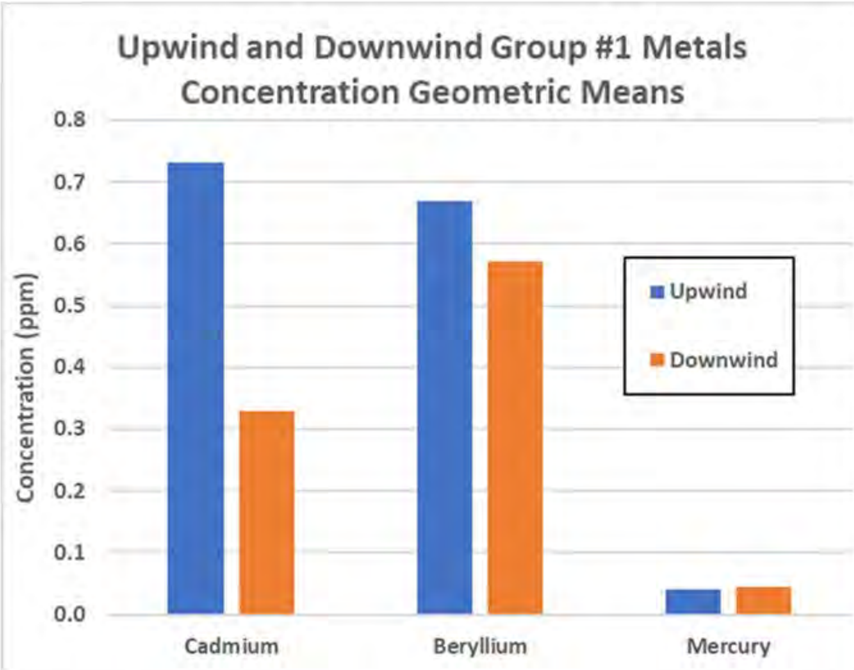


Figure D3 - Geometric means of all quantitative and qualitative metal samples (group 1).

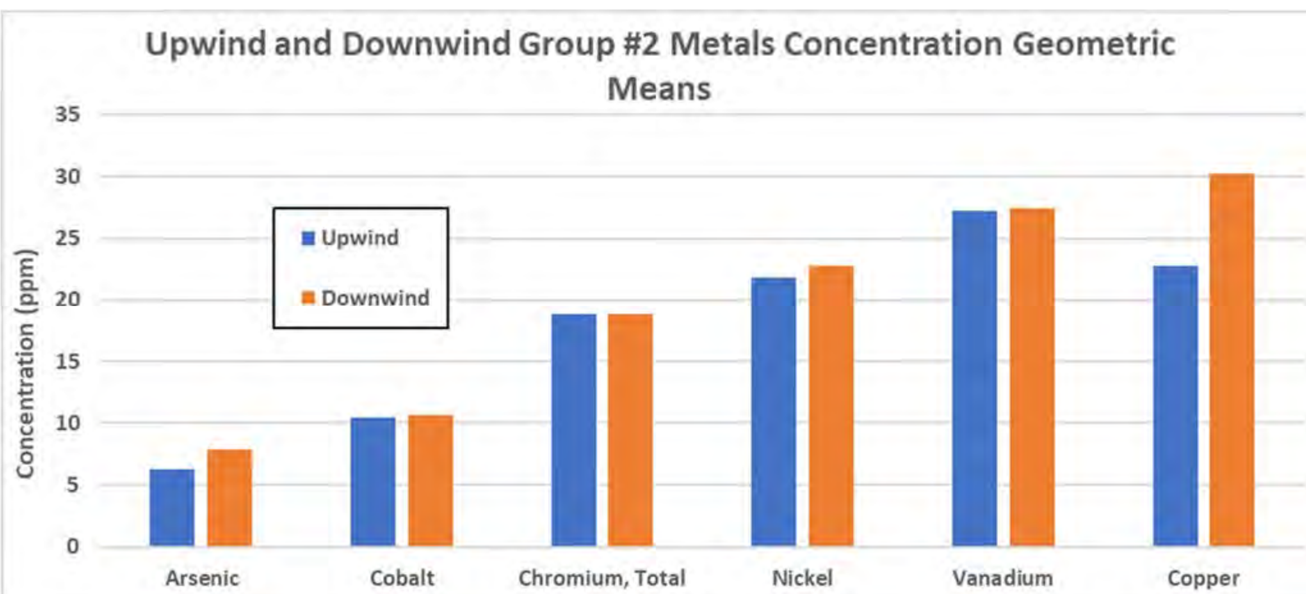


Figure D4 - Geometric means of all quantitative and qualitative metal samples (group 2).

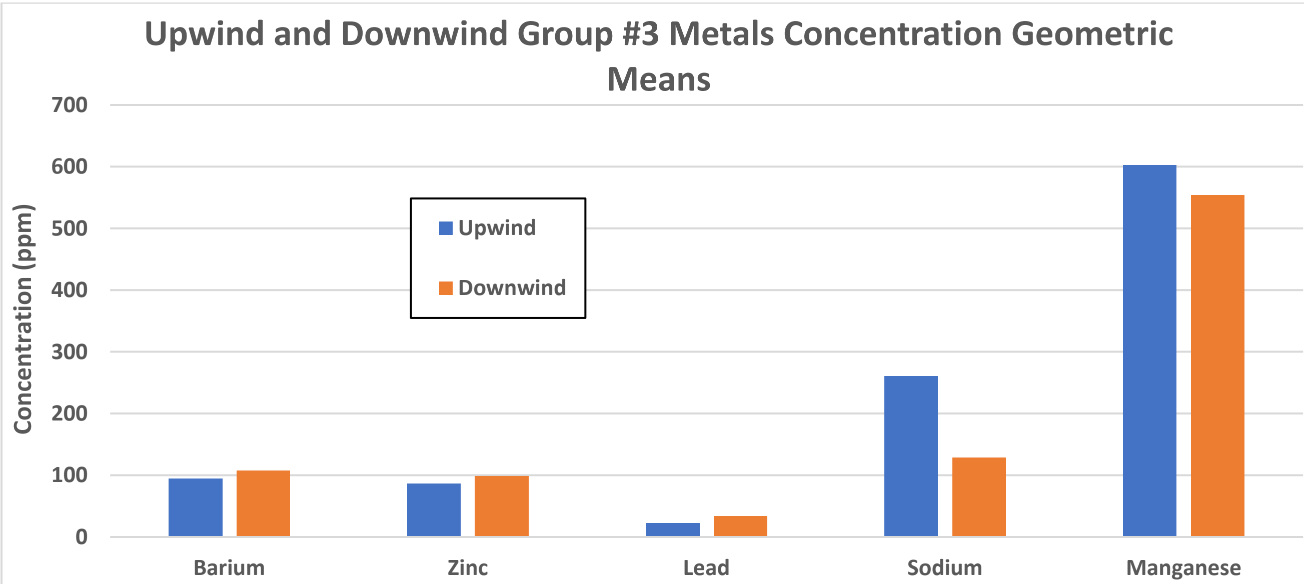


Figure D5 - Geometric means of all quantitative and qualitative metal samples (group 3).

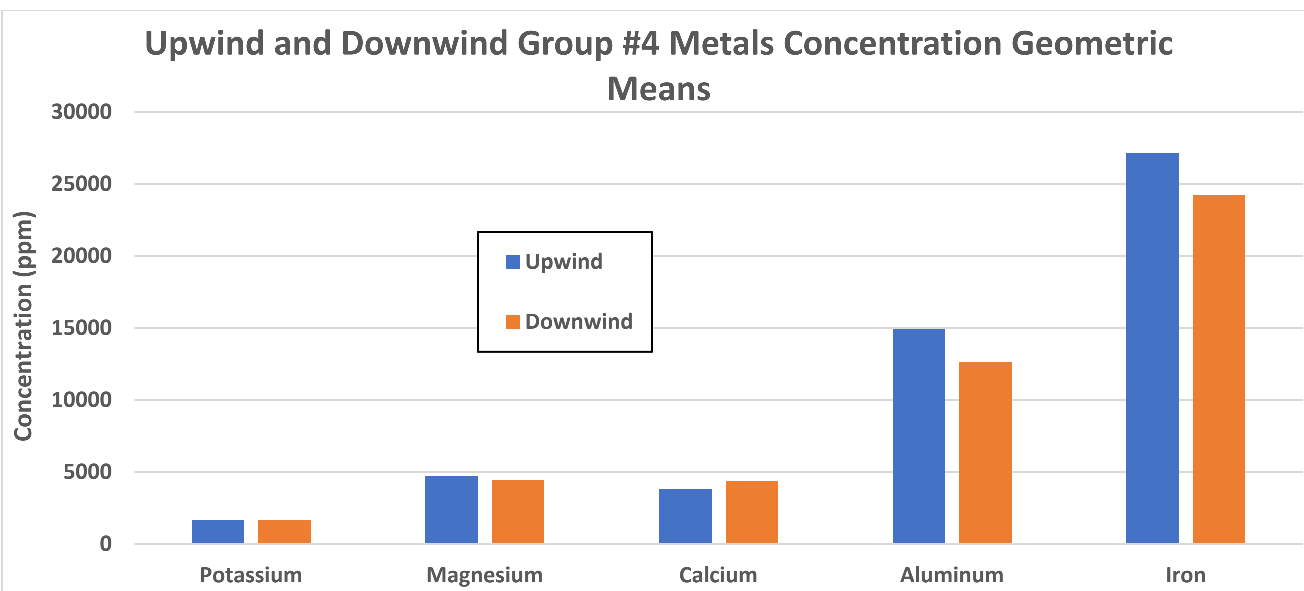


Figure D6 - Geometric means of all quantitative and qualitative metal samples (group 4).