THE EMERGING THREAT OF PFAS CONTAMINATION AT AIRPORTS

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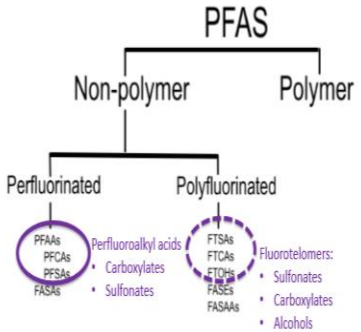
Overview

- What is PFAS, sources, cause of impacts
- Foam & PFAS environmental regulations
- Airport PFAS impacts & proposed investigation
- Case Study – Westchester Airport
- Observations & recommendations

Per- Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a large group of compounds used in non stick coatings, textiles, paper products, some firefighting foams, and many other products.



Large Class of Surfactants

- Unique chemical and physical properties
  - Make them very mobile in the environment
  - Do not breakdown
- Used since 1940s wide range of consumer and industrial applications

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Sources of PFAS

Four major sources of PFAS

- Fire training/fire response sites
- Industrial sites
- Landfills
- Wastewater treatment plants/biosolids

Cause of PFAS at Source Areas

Use of Aqueous Film Forming Foam (AFFF)

- Military installations
- Civilian airports
- Petroleum refineries
- Fire fighting training areas

FAA Foam Requirements

- FAA requires use of flourosurfactants foam
- Fluorinated foams contain PFAS
- Currently used at most airports to put fires out.
- Fluorinated-free foams do not contain PFAS
- Firefighting industry best practice call for use of fluorine-free foam (FFF) for testing and training
- FAA reauthorization action of 2018 will allow use of FFF within 3 years

Fire Fighting Foam - Best Practices

Storage

- Develop inventory and tracking system
- Designate transfer and storage areas
- Design storage tanks to minimize evaporation of concentrate
- Properly maintain foam systems
- Ensure compatibility of foams before change-outs

Use

- Consider the firefighter and public safety first
- Eliminate fluorinated Class B foams for training and testing
- Provide containment, treatment, and proper disposal
- Collect, treat and properly dispose of runoff/wastewater
- Use appropriate PPE
- Keep records of when/where foam is used
- Make note of any sensitive receptors

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Regulatory Drivers

- Add

Regulatory Approaches

- Add

Contaminants of Emerging Concern

To comply with the Technical Requirements for Site Remediation (N.J.A.C. 7:26E), all contamination, including all discharged hazardous substances, hazardous wastes, and pollutants, must be addressed. Contaminants of emerging concern, if discharged to the waters or onto lands of the State, are pollutants that must be remediated using a Licensed Site Remediation Professional (LSRP). When the remedial objective for a site is an entire site final remediation document and the site is currently or was formerly occupied by facilities that stored, handled, and used contaminants of emerging concern, LSRPs must consider these contaminants of concern during the investigation and remedial action. LSRPs must evaluate the site for potential spills and releases through air, water, and waste discharges.

Source NJDEP Website – Emerging Contaminants

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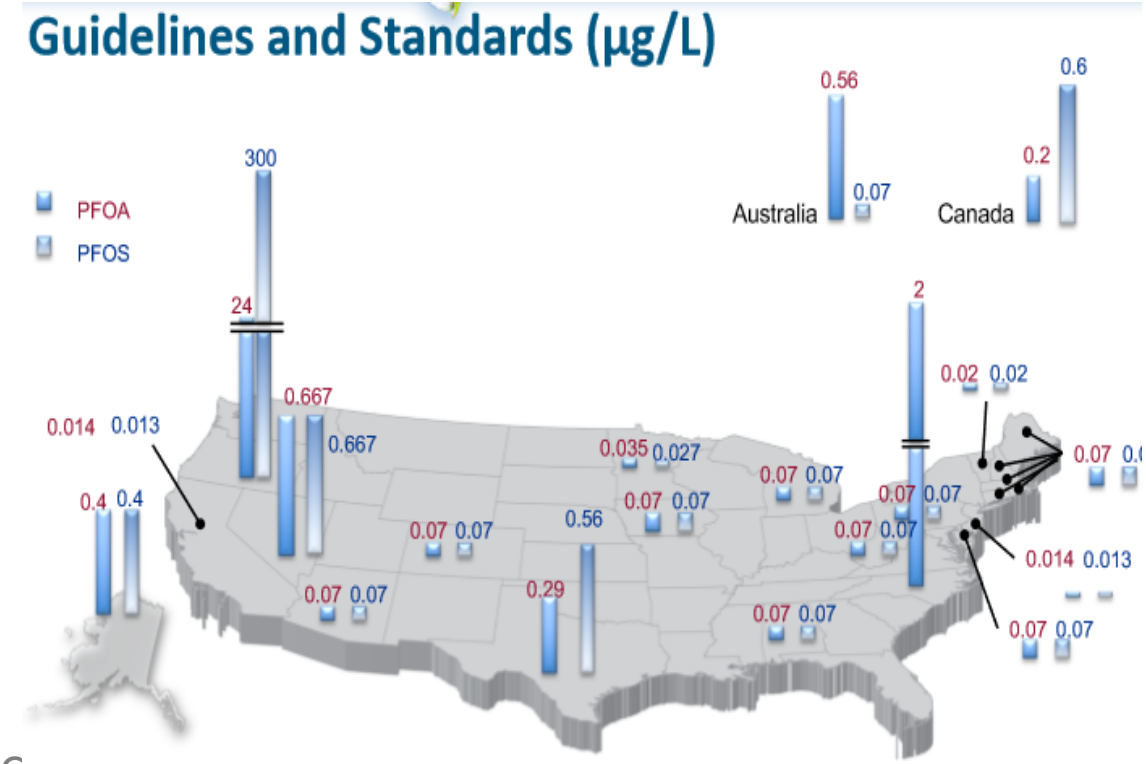
State PFOA & PFOS Guidelines & Standards



Source: 2019 ITRC

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PFAS Impacted FTA

- Fire Fighting Foam impacted sites often are also contaminated with petroleum hydrocarbons from unburned fuel. PFAS and hydrocarbon plumes at these sites may follow the same flow paths, though the extent of contamination may be signify
- PFAS are adsorbed to organic carbon rich soil, and more under low pH conditions, resulting in continuous source to groundwater contamination.
- While most research literature focuses on PFAAs (per) (especially PFOS and PFOA), processes affecting precursor PFAS (poly) that can degrade to PFAAs over time are also important.

Case Study: Westchester Airport Site Investigation

OBJECTIVE: Assessed environmental impacts at airport and potential impacts to large NYC drinking water supply

1. Hydrogeologic evaluation of Airport to develop conceptual understanding of groundwater flow patterns and recharge areas
2. Detailed evaluation of Airport property to identify all possible contaminant sources and investigate each possible source individually to determine its effect, if any, upon the surrounding environment. This second phase would include document reviews and intrusive field investigations, as necessary.
3. Devise monitoring plan to ensure ability to systematically evaluate and react to any potential groundwater contamination threat from the Airport to the waters of Rye Lake and surrounding community

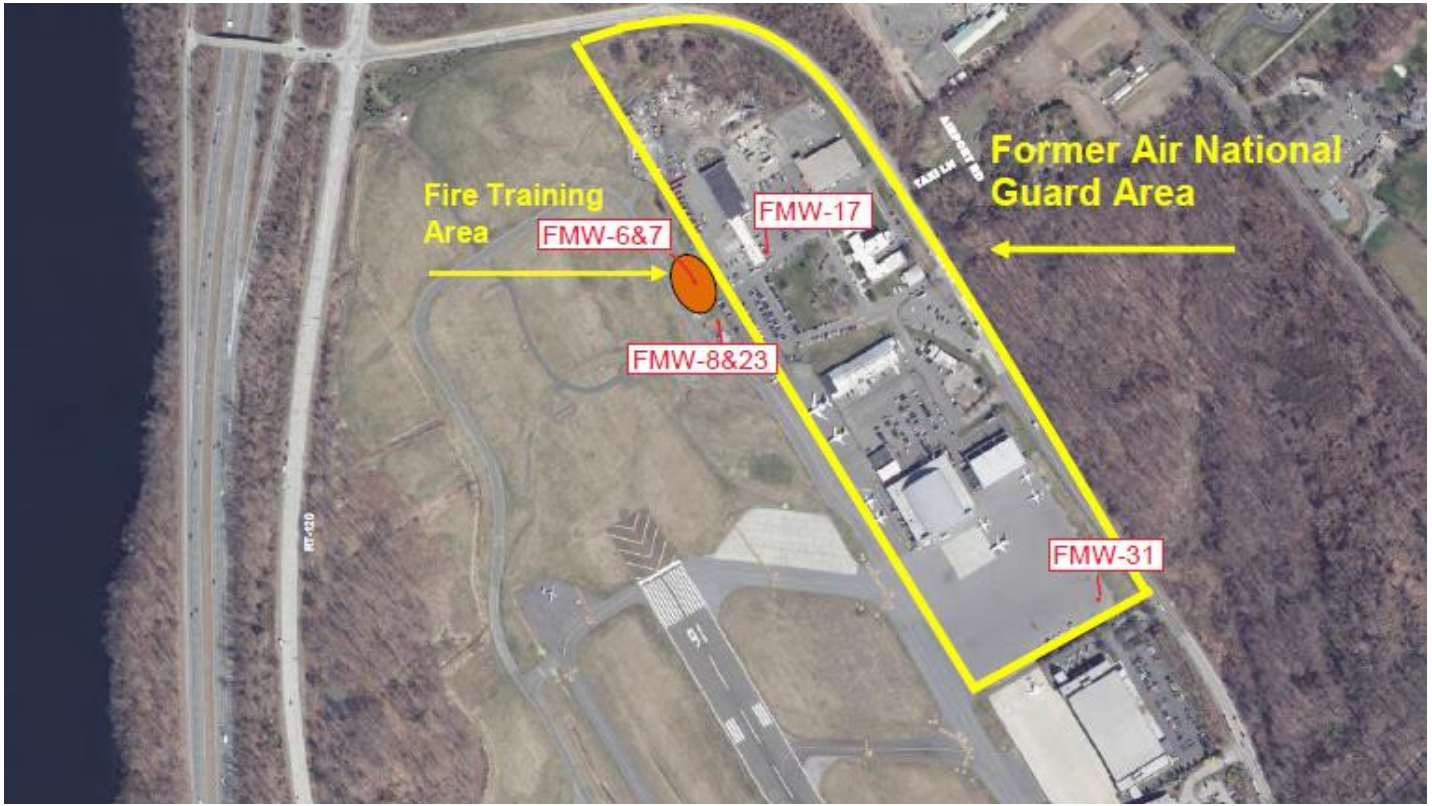
FTA Soil Contamination

FTA sites often contaminated with petroleum hydrocarbons from unburned fuel

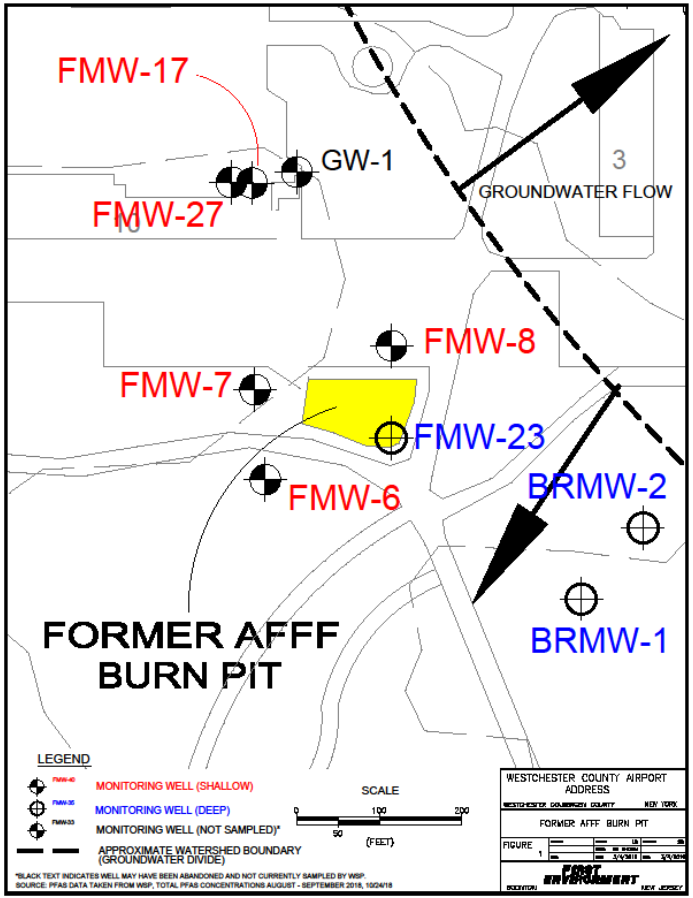
Findings & Update

- From 1999 to 2001, one AOC identified petroleum impacts associated with unburned fuel
- A groundwater divide identified a portion of the groundwater movement across the Airport actually flows toward Rye Lake
- The FTA was in the area where groundwater would flow to Rye Lake
- In all, 2,800 tons of impacted soil was removed at the former FTA
- FTA impacts were closed by NYSDEC
- A groundwater monitoring program was implemented to systematically evaluate and react to future potential groundwater contamination threat from the Airport to the waters of Rye Lake and the surrounding environment
- Since 2001, semi-annual groundwater monitoring has monitored groundwater quality
- In 2016, Per- Polyfluoroalkyl Substances (PFAS) was identified in groundwater at the Airport in 27 of the 51 monitoring wells above the EPA's lifetime exposure level of 70 ppt
- NYSDEC has not established a clean-up standard for PFOA/PFOS in groundwater, but has ordered an investigation of groundwater resulting from the PFOA/PFOS

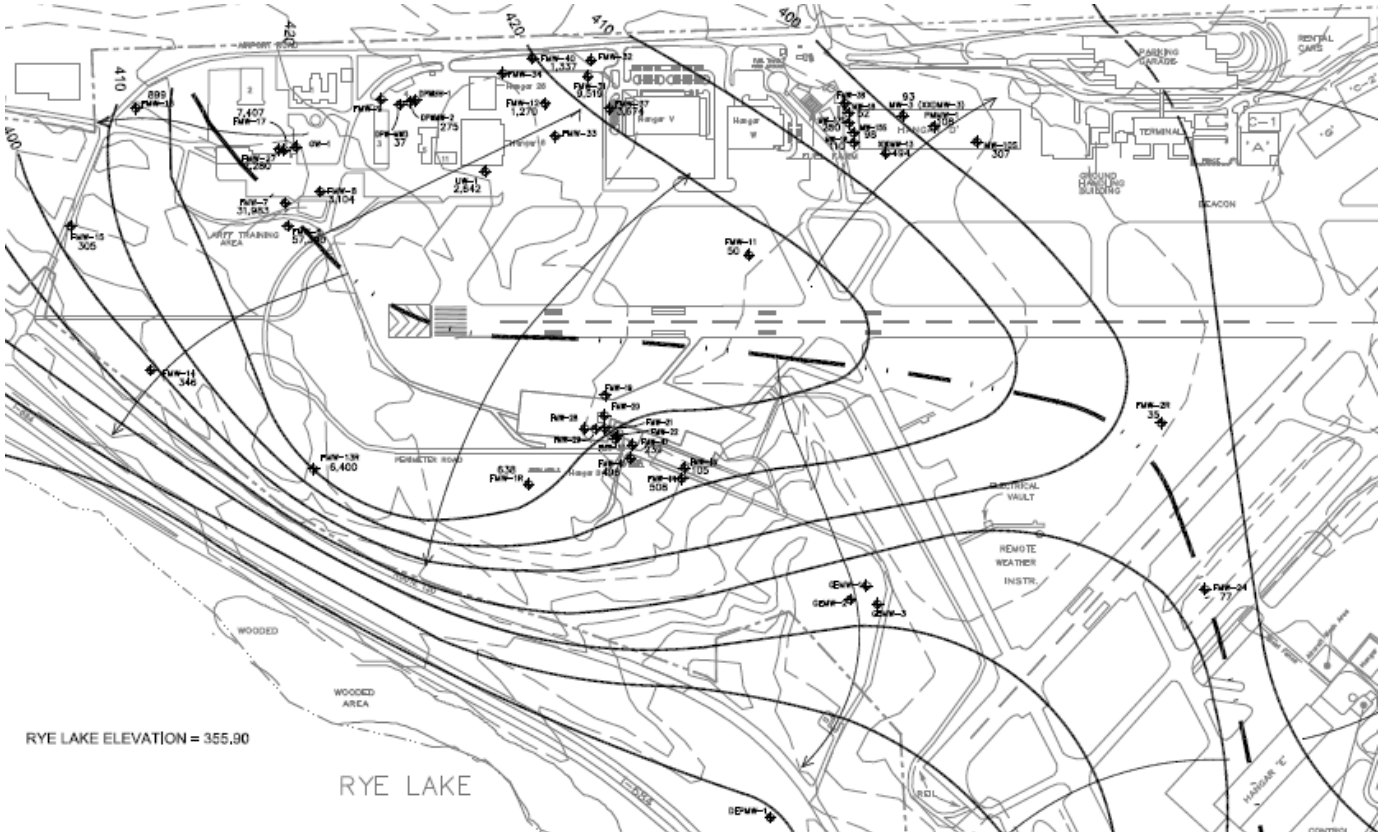
Former Air National Guard Area



Location of Fire Training Burn Pit



Groundwater Flow

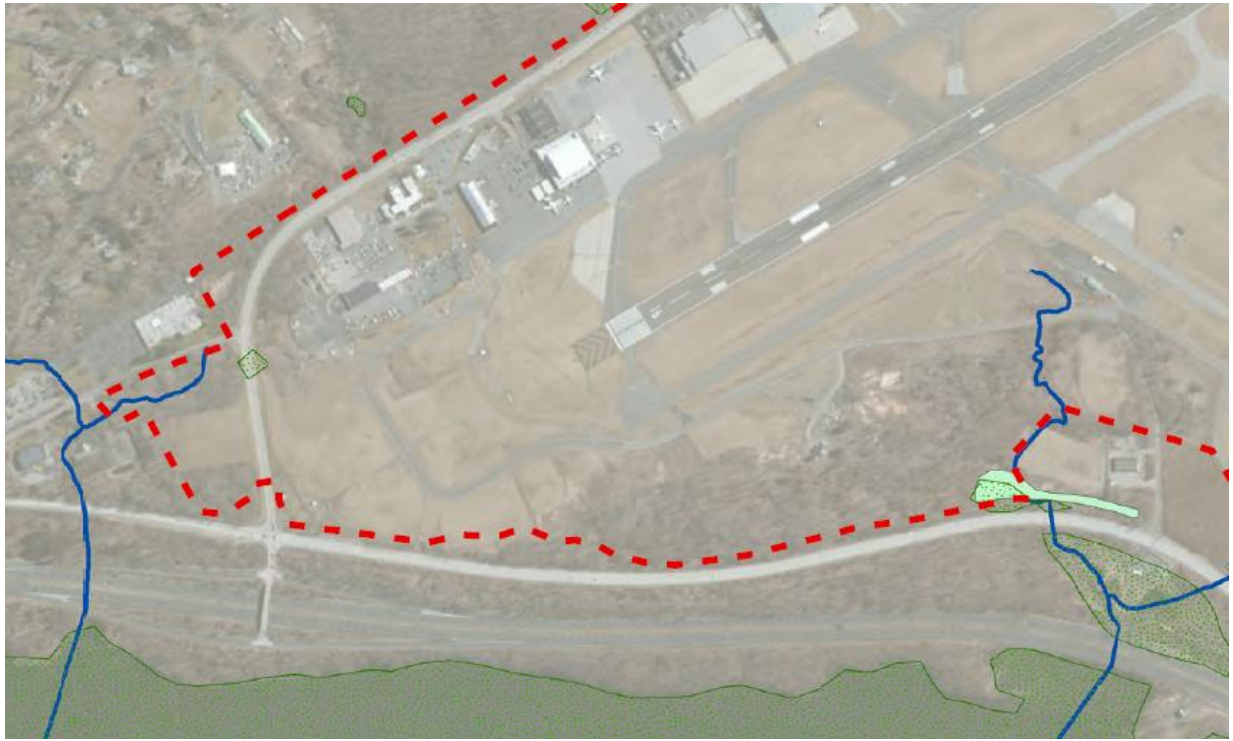


Soil Removal – FTA Burn Pit

Excavation of Burn Pit 1999-2000 2800 tons

Surface Water to Water Supply

Surface water flow to NYC water supply



Surface Water

Staff gauges to evaluate groundwater interactions

PFAS Groundwater Testing

- Because of the PFAS threat to the large public water supply
  - PFAS chemicals are labeled as emerging contaminants of concern to human health and the environment
  - Aqueous film-forming foam (AFFF), a source of PFAS, was used for fire training exercises for almost 30 years at the airport FTA
- The NYSDEC required groundwater be tested for PFAS
- Groundwater collected from 27 of 51 monitoring wells identified PFOA/PFOS above the 70 ppt

PFAS identified in Groundwater

Well location, aquifer, impacted by PFAS groundwater contamination

Total All PFAS (ppt)	Total PFOA & PFOS (ppt)	Well	Well Depth (ft btoc)	Aquifer
57,390	**13,700**	FMW-6	10.70	Unconsolidated
31,983	**14,940**	FMW-7	10.00	Unconsolidated
9,519	**5,070**	FMW-31	19.65	Unconsolidated
7,407	**5,462**	FMW-17	9.48	Unconsolidated
6,400	**1,190**	FMW-13R	17.55	Unconsolidated
3,674	**1,910**	FMW-37	13.40	Unconsolidated
3,104	**1,390**	FMW-8	11.00	Unconsolidated
2,642	**2,010**	UW-1	13.29	Unconsolidated
2,280	**1,380**	FMW-27	11.64	Unconsolidated
1,735	**441**	FMW-23	42.30	Bedrock
1,542	**320**	WW-1	62.10	Bedrock
1,337	**639**	FMW-40	12.70	Unconsolidated
1,283	**480**	XDDMW-11	41.30	Bedrock
1,270	**594**	FMW-12	18.78	Unconsolidated
899	**390**	FMW-16	15.80	Unconsolidated
638	**299**	FMW-1R	15.25	Unconsolidated
625	34	FMW-36	51.50	Bedrock
569	**170**	MW-43	67.30	Bedrock
508	**188**	MW-44	18.10	Unconsolidated
496	**230**	MW-45	15.00	Unconsolidated
494	**190**	XDDMW-13	38.60	Unconsolidated
414	**117**	MW-42	58.50	Bedrock
346	**123**	FMW-14	15.45	Unconsolidated
315	38	MW-48	72.45	Bedrock
307	**101**	MW-10S	32.00	Unknown

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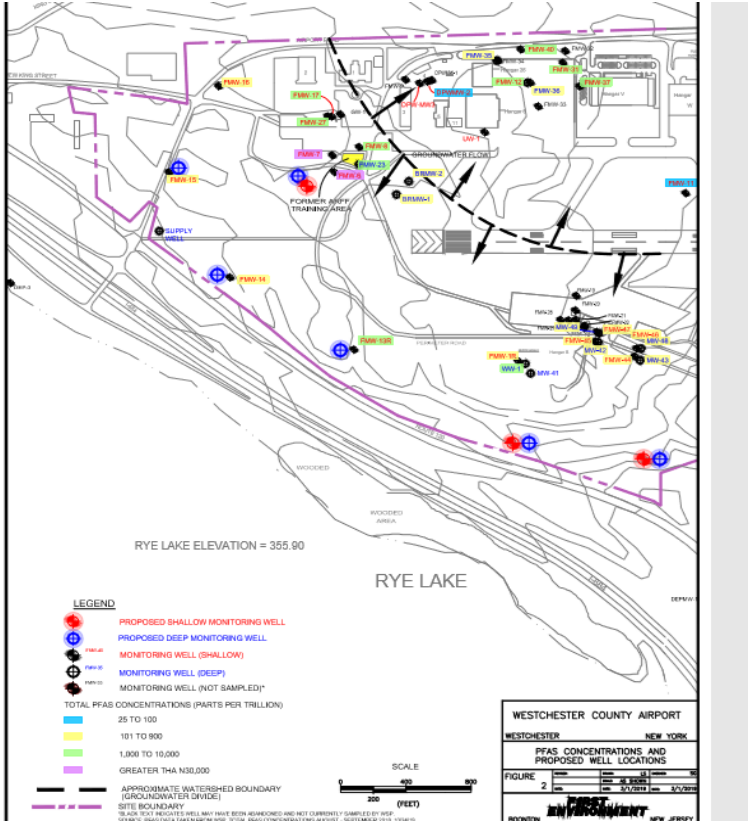
Future Investigation



Observations & Recommendations

- If you have conducted fire training exercises using AFFF at a burn pit – the site likely has PFAS impacts
- Research the state requirements for PFAS
- Sampling for PFAS can put you into regulatory program
- Gather release information as soon as possible
- Do a visual surface delineation after new release
- Perform field screening after release
- Consider using non-fluorinated foams that do not contain PFAS chemicals for fire fighting training activities