Norwalk River Watershed Association, Inc.

PO Box 7114
Wilton, CT 06897
norwalkriver.org

February 13, 2023

To: Lynne Vanderslice, First Selectman

Cc: Selectmen Joshua Cole, Kimberley Healy, Basam Nabulsi, and Ross Tartell
Director Environmental Affairs, Mike Conklin
Conservation Commissioners Jackie Algon, Sadiqua Azad, Jeff Lapnow, Colleen O'Brien, David Silvia
Inland Wetlands Chair, Rick Stow
Director of Parks & Recreation, Steve Pierce

Re: Request for independent environmental and public health risk assessment of proposal to install artificial turf field at Allens Meadows

Dear Lynne,

I write on behalf of the Norwalk River Watershed Association and its over 2000 members and participants to request that before the town votes to add an artificial turf field at Allens Meadows, it conducts a risk assessment and public information session and discussion that addresses the known threats to the environment and drinking water posed by the many harmful chemicals and toxins, including micro-plastics and PFAS "forever chemicals," documented to be present in turf fields, including those without crumb rubber infills.

While we understand that the town has identified the need for a new playing field with a dome, we are concerned that the public and town officials may not be aware of the health hazards associated with installing artificial turf fields, especially so close to the Norwalk River and directly over an aquifer identified by the State as future drinking water for the town.

Our concerns are best presented in this recent webinar by health experts (skip the intro). We have also listed some of them here:

PFAS contamination. There is evidence, now, that **all** artificial turf fields contain PFAS, the "forever chemical" which persists forever and bio-accumulates in the environment and our bodies and moves easily into fresh and marine waters (see attached Powerpoint from Notre Dame). When PFAS leaches into drinking water and the environment, it is known to harm aquatic life and to cause cancer and a host of other human health problems (CDC report outlining health risks). The proposed site for this field, Allens Meadows, is roughly 300 yards from the Norwalk River and is bisected by Goetzen Brook which drains into the river. Allens is also situated over an aquifer designated as future drinking water. In Norwalk, three drinking water wells operated by the First Taxing District water company are already

closed due to the presence of PFAS, so this is a real and present threat in our watershed. Baseline testing of the waters in and around Allens conducted by NRWA through a certified lab shows that several PFAS chemicals are already present in the Norwalk River and Goetzen Brook, but at small levels. Protecting this area from additional PFAS contamination is important for protecting public health and our fish and wildlife populations as well as property values, potentially, of homes that rely on well water. In June the EPA issued interim health advisories stating there is essentially no safe level of PFAS in drinking water.

Academic studies and real-world examples show water around turf fields quickly becomes contaminated. An example of a situation like the one Wilton potentially faces occurred in the town of Easton, Massachusetts, where fields were installed near a drinking water source. That town is currently paying $9 million in remediation costs to address PFAS found in drinking water since the fields were installed. Kyla Bennett, a town resident and expert on this issue, is available to speak to you directly about the work required in Easton now, and will be a speaker at our March 1st webinar, *The Hazards of Artificial Turf.* Connecticut Water, one of the State's largest providers, is suing 3M and other manufacturers of PFAS to recover costs needed for removing PFAS from drinking water. Senate Bill 100, this legislative session, provides funding to municipalities for PFAS testing and remediation. Cleanup of PFAS will fall to the town, so we need to be careful about adding it to our environment.

Field Turf, one of the largest suppliers, claims their fields are PFAS free. This same company, however, is being sued by Portsmouth, NH for false advertising regarding its claims that its product is PFAS-free. A Portsmouth group cut off a section of the new turf that was being installed in their town, and which was advertised as being PFAS-free, and had it tested for PFAS. The tests showed a substantial presence of the chemicals. Studies from Portsmouth, NH, available in the attached PowerPoint, also show over 40ppt of 6 PFAS chemicals in a stream downgradient from the high school turf field after installation.

Professor Graham Peaslee of University of Notre Dame has conducted a study of dozens of different new and used turfgrass samples for total fluorines (contained in PFAS chemicals) and found the presence of these chemical elements in all of them. Each blade of grass is coated in PFAS, but also all the layers of the field contain PFAS, as well. The machines that make the fields contain PFAS. An overview of the findings is available in the attached PowerPoint. Findings include, for example, 12 ppt of 6 types of PFAS leaching off a new field in Martha's Vinyard, MA, and that amount increasing as the field ages.

The Norwalk River feeds into the Sound at the epicenter of Connecticut's $30 million shellfish industry. We have a responsibility to protect the seafood that benefits our community. In Florida, oysters have been found to be contaminated with PFAS, and here in our watershed, the Norwalk Shellfish Commission is extremely concerned about the threat posed by PFAS.

Disposal costs. The presence of PFAS also makes Turf fields, which last 8-10 years (most warrantees are for 8 years), impossible to safely dispose of. From landfills, the PFAS will enter ground water. When incinerated, PFAS remains intact and enters the air for us to breath. Some companies claim that parts of their fields are recyclable, but there are no facilities for this in the US, and, so far, no fields in this country have been recycled.

PFAS in fields is not the only chemical problem. Most fields contain other chemical carcinogens as well and also may contain neurotoxins and reproductive toxicants including lead, zinc, phthalates and plasticizers as well as respiratory irritants, like silica, making asthma worse. Many of these chemicals also have been shown to harm aquatic and marine life.

Turf fields shed microplastics over the course of their 8-10-year lifespan. These can be inhaled by players on the field, and they will wash into storm drains, the Norwalk River and Long Island Sound. Studies show that one field sheds 480 pounds of microplastics a year.

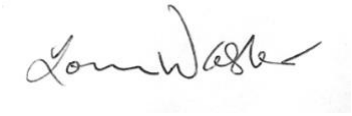
Extreme heat conditions are also a health hazard and contribute to urban heat island affect and climate change. Instead of absorbing carbon dioxide the way grass does, these fields release CO2, methane, and a host of other chemicals. The life of one field from manufacture to disposal generates 55.6 tons of CO2. Plastic turf absorbs solar radiation and there is no chance for evaporation, as with natural fields, so surface temperatures have been shown to reach up to 200 degrees F. On average fields are 50 degrees hotter than grass and air temperature at head height is 70 degrees hotter. Watering is used to cool the fields, so watering systems are absolutely necessary. Heat illness is the number one cause of death in high school athletes. The abrasions and 1st and 2nd degree burns from turf are some of the reasons professional athletes demand grass fields and refuse to play on turf. Using infill that is not crumb rubber will reduce the heat a little (about 5 to 10 degrees), but not as much as many companies claim. This study shows why.

We need to hear from impartial experts on this issue. The mistake many towns have made has been to rely on safety information from the companies selling and installing these fields. Wilton needs to consider the many academic studies now available that measure the environmental and human health risks posed by installing fields. One place to start is this webinar mentioned above by Citizens Campaign for the Environment. We should also hear from towns like Martha's Vineyard and Portsmouth NH which are disputing the safety claims these companies have made. Please join the webinar NRWA is hosting on this issue on March 1 at 6:30PM—Register Here.

PFAS can enter the human body through inhalation, dermal absorption, and ingestion. These fields would threaten Wilton athletes in all three ways. Let's listen to the US Women's Soccer team and many pro football teams which are demanding grass fields because they are safer and better to play on. Our kids deserve the best.

Thank you for your time and patience with this long letter. We are happy to help bring experts on the environmental and health threats of these fields to Wilton to speak directly to you and to answer the public's questions. We hope you will join the webinar March 1 here.

Sincerely,



Louise Washer, President
Norwalk River Watershed Association

PFAS in Artificial Turf

Graham Peaslee, University of Notre Dame, gpeaslee@nd.edu

Kristen Mello, WRAFT, klm.wraft@gmail.com

NEWMOA Conference, April 6, 2022

Introductions & Background

Kyla Bennett (left) and Tracy Stewart (right) at used turf piles in Franklin, MA.
Boston Globe, October 9, 2019

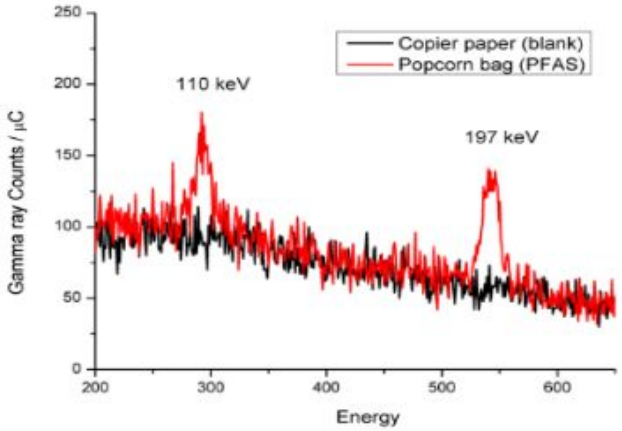
Why are there PFAS in my turfgrass?

Graham Peaslee & Heather Whitehead

- We have screened dozens of different new and used turfgrass samples for total fluorine….

PIGE Analysis of Fluorine

Fig. 3: PFAS-coated paper sample compared with uncoated paper. Irradiation time of 180 second with 9 nA of 3.4 MeV protons.



Spectroscopic technique
Rapid (<180 seconds)
Non-destructive

PIGE
Screen for samples with high total fluorine concentrations

PFAS Extraction
Basic methanol to collect extractable PFAS compounds

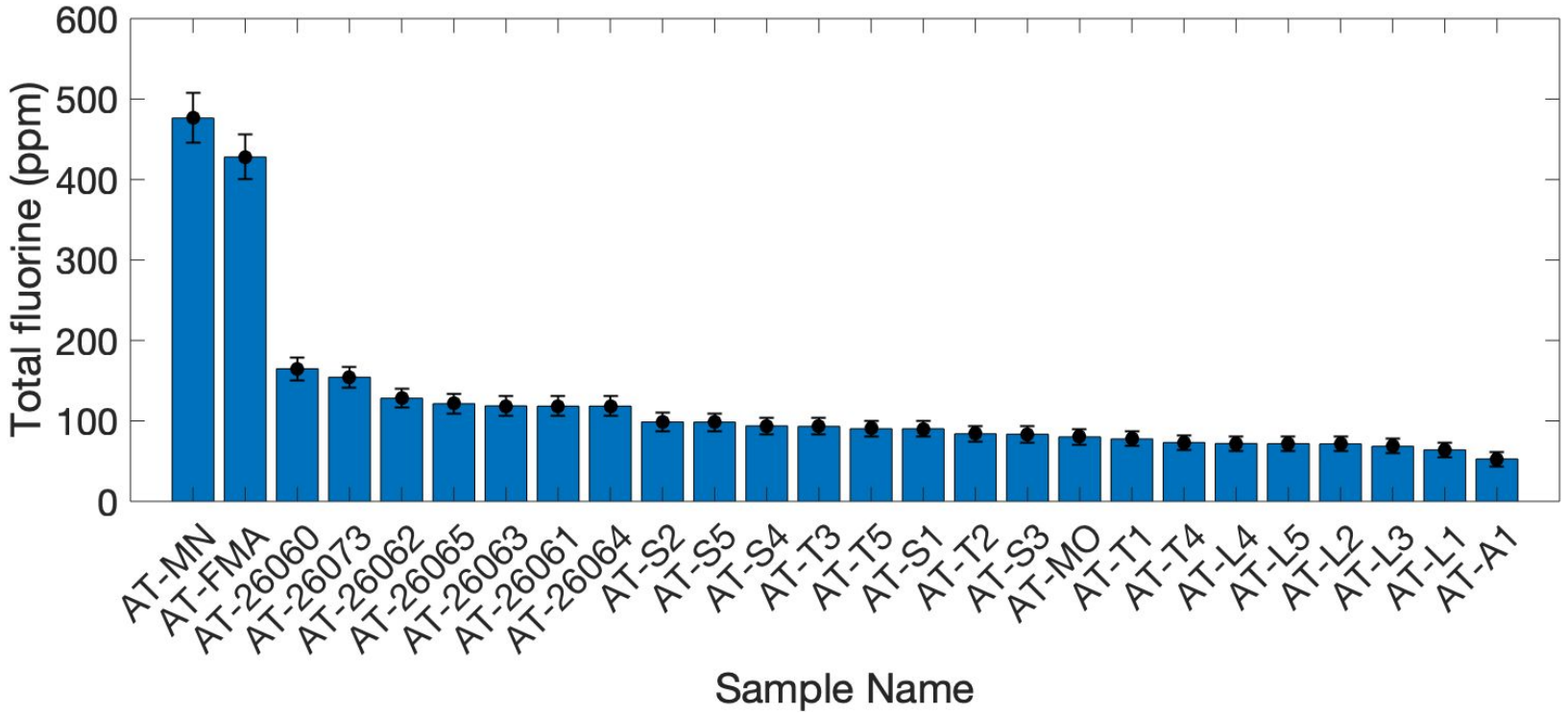
TOP Assay
$[S_2O_8]^{2-} + heat \rightarrow 2[SO_4]*^-$
$SO_4^- * + OH^- \rightarrow SO_4^{2-} + OH*$

SPE
Clean up & enrichment

Control Extracts

LC-MS/MS
Quantification of 9 PFCAs & PFSAs using targeted MRM analysis

PIGE Analysis: Artificial turf



Heather Whitehead, 2022

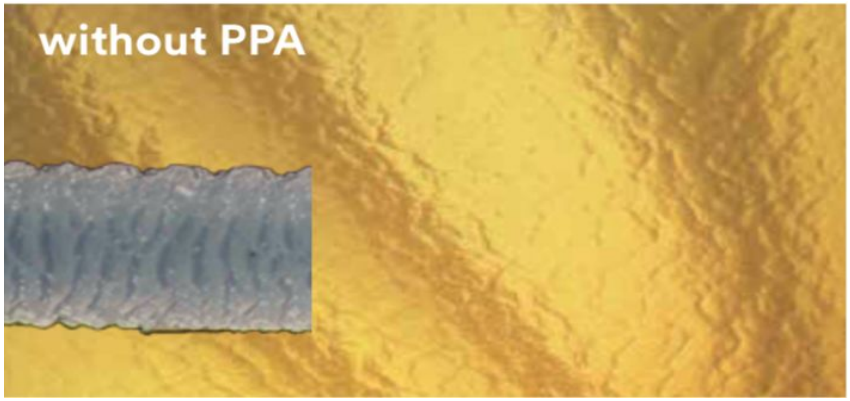
Why are there PFAS in my turfgrass?

Graham Peaslee & Heather Whitehead

- We have screened dozens of different new and used turfgrass samples for total fluorine….
- Where does this fluorine come from?

Polymer Processing Aids

- Improve production efficiency by reducing common issues such as melt fracture, & die build-up

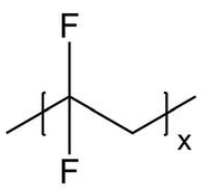


3M ™ Dynamar ™ Polymer Processing Additives Product Comparison Guide. 2016.

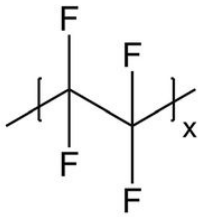
Vinylidene Fluoride & Hexafluoropropylene

- 50-95 weight % VDF
- 5-50 weight % HFP
- Ideal Fluorine to Carbon ratio is 1:2

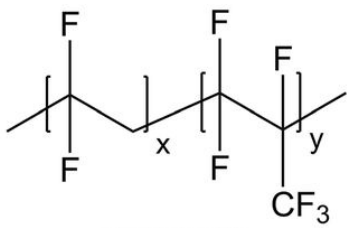
Special Cases



PVDF



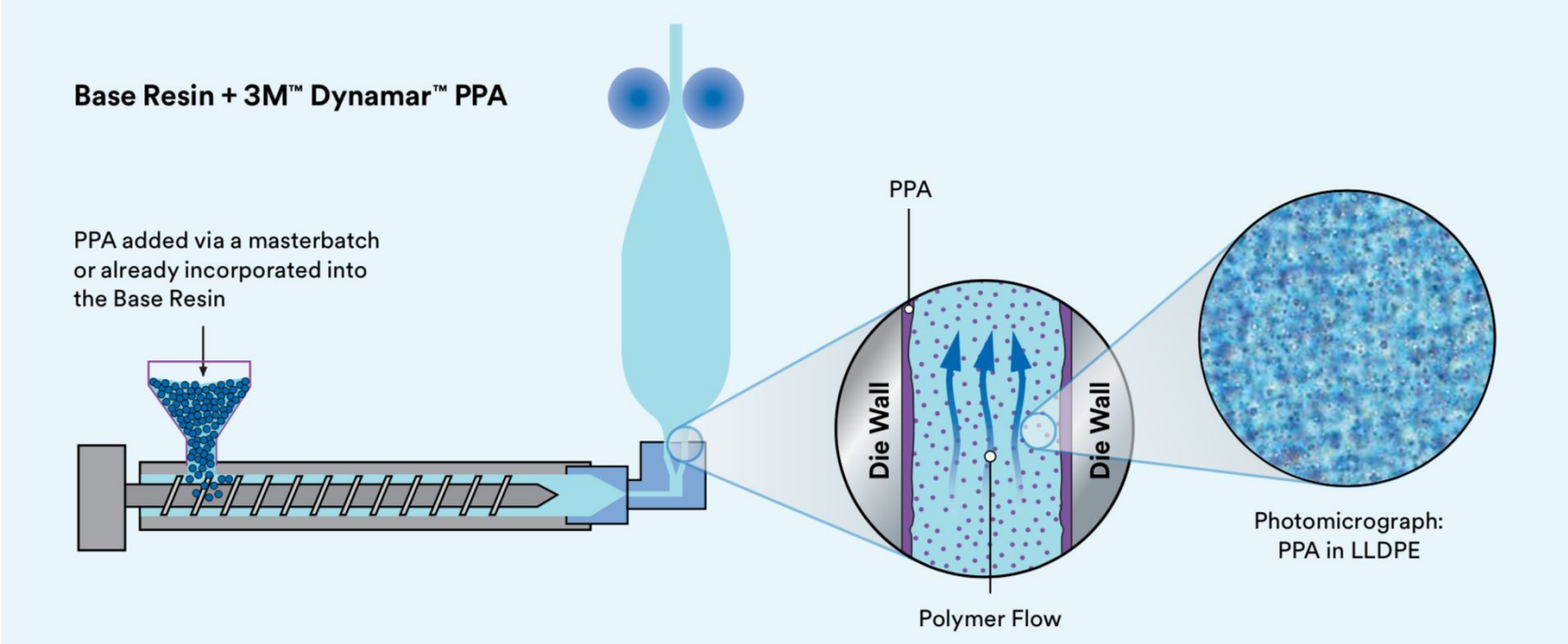
PTFE



PVDF-HFP

- 100% VDF is PVDF
- > 65% VDF is PVDF Copolymer
- > 35% HFP is Fluoroelastomer (FKM)*
  - Chemical resistant O-rings, seals, tubing (Viton by DuPont)

Seiler, D. A et al., *Handbook of Industrial Polyethylene Technology* **2016**, 889-908.



- PPA is immiscible with the polymer and has a higher affinity for the metal surface, creating a slip surface
- Used at 20-2000 ppm in masterbatch depending on the application, type and concentration requires optimization

PPA Applications & Producers

- Food packaging
- Produce, grocery, and department store bags
- Liquids packaging

- 3M: Dynamar, Dyneon
- DuPont: Viton, Viton Free Flow
- Arkema: Kynar
- Daikin: Dai-El

<u>Artificial Turf</u>

3M FX-5911: Copolymer of VDF, HFP, & TFP

3M FX-9613: Copolymer of VDF & HFP + additives

Seiler, D. A et al., *Handbook of Industrial Polyethylene Technology* **2016**, 889-908.

3M ™ Dynamar ™ Polymer Processing Additives Product Comparison Guide. 2016.

Consultants Confirm

"...there is [*sic*] PFAS used in the extrusion of the fibers. That's true. There is. It's a polymeric compound called PVDF."

David Teter, at the meeting of the Standing Building Committee, Sharon, MA on January 21, 2020.

(https://sharontv.com/programs/government-meeting/)

"The PFAS in Synthetic Turf is not a contaminant. It is a slip agent that is intentionally added to the molten hydrocarbons in order to make the plastic grass blades free of defects."

Laura Green, at the meeting of the Board of Health, Oak Bluffs, MA on November 9, 2021.

(https://oakbluffs.zoom.us/rec/share/VNVkEYuze0E-gzoYmUi8umSRsOmAE-dUt1t92wo9s9Tzdf4UVW5jW5Dfw9hQMVc2.ZL_TP0WGKGlPLwcu)

Manufacturer Documents

City of
Portsmouth
Department of Public Works

MEMORANDU

TO: Suzanne Woodland, Acting Deputy City Manager

FROM: Peter Rice, Director of Public Works

DATE: 12/6/21

SUBJECT: Updated Information Regarding Manufacturing Process and New Athleti
Field

In follow up to the Memorandum of December 1, 2021 which is part of the City Council pack
staff has obtained the following additional information.

1. The manufacturer in Germany has produced Material Safety Data Sheets and the 3M additives used in their processes. Those MSDS sheets are attached.

   PVDF-HFP is a component of the additive. As was discussed at the Work Session, PVDF-HFP is a polymeric PFAS, namely a part of that very broad class of thousands
   compounds covered under the general term of PFAS. It is not one of the PFAS of Concern for which the City tested.

3M

Safety Data Sheet

Document Group:	06-2189-6	**Version Number:**	44.05
Issue Date:	08/21/18	**Supercedes Date:**	08/21/18

SECTION 1: Identification

1.1. Product identifier
3M™ Dynamar™ Polymer Processing Additive FX 5920A

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Calcium Carbonate	471-34-1	< 5
Polyethylene Glycol	25322-68-3	60 - 70
Vinylidene Fluoride-Hexafluoropropylene Polymer	9011-17-0	25 - 35
Talc	14807-96-6	0.1 - 5 Trade Secret *

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

10.6. Hazardous decomposition products

Substance	Condition
Carbonyl Fluoride	At Elevated Temperatures
Formaldehyde	At Elevated Temperatures
Carbon monoxide	At Elevated Temperatures
Carbon dioxide	At Elevated Temperatures
Hydrogen Fluoride	At Elevated Temperatures
Toxic Vapor, Gas, Particulate	At Elevated Temperatures

Extreme heat arising from situations such as misuse or equipment failure can generate hydrogen fluoride as a decomposition product.

Pause for a little bit of detail…
Talkin' nerdy

Detection Limits vs Reporting Limits and Regulatory triggers

Constraints of Commercial Laboratory Requirements and Academic/Research Laboratory Flexibility with respect to protocol, sample prep, and matrix effects.

Limited data.

Field Component Test Results
Sharon, MA

TABLE 2 - Leachable SPLP PFAS results for the tested synthetic turf carpets by EPA Method 537(M). All results are in parts per trillion.

Analyte Class	Analyte Name	FieldTurf Vertex	FieldTurf Vertex Prime	SprintTurf 46-oz DFE
Perfluoroalkane Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluoropentane sulfonic acid (PFPeS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluorohexane sulfonic acid (PFHxS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluoroheptane sulfonic acid (PFHpS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluorooctane sulfonic acid (PFOS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluorononane sulfonic acid (PFNS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluorodecane sulfonic acid (PFDS)	< 4.8 U	< 4.6 U	< 4.9 U
	Perfluorobutanoic acid (PFBA)	< 4.8 U	< 4.6	
	Perfluoropentanoic acid (PFPeA)	< 4.8 U	< 4.6	
	Perfluorohexanoic acid (PFHxA)	< 9.6 U	< 9.3	
	Perfluoroheptanoic acid (PFHpA)	< 4.8 U	< 4.6	
	Perfluorooctanoic acid (PFOA)	< 1.9 U	< 1.9	
	Perfluorononanoic acid (PFNA)	< 4.8 U	< 4.6	
	Perfluorodecanoic acid (PFDA)	< 4.8 U	< 4.6	
	Perfluoroundecanoic acid (PFUnDA)	< 4.8 U	< 4.6	
	Perfluorododecanoic acid (PFDoDA)	< 4.8 U	< 4.6	
	Perfluorotridecanoic acid (PFTrDA)	< 4.8 U	< 4.6	
	Perfluorotetradecanoic acid (PFTeDA)	< 4.8 U	< 4.6	
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)	< 4.8 U	< 4.6	
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	< 4.8 U	< 4.6	
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	< 4.8 U	< 4.6	
	N-Methyl perfluorooctane sulfonamidoethanol	< 4.8 U	< 4.6	
	N-Ethyl perfluorooctane sulfonamidoethanol	< 4.8 U	< 4.6	
	N-Methyl perfluorooctane sulfonamidoacetic acid	< 4.8 U	< 4.6	
	N-Ethyl perfluorooctane sulfonamidoacetic acid	< 4.8 U	< 4.6	
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	< 4.8 U	< 4.6	
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	< 4.8 U	< 4.6	
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	< 4.8 U	< 4.6	
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	< 4.8 U	< 4.6	

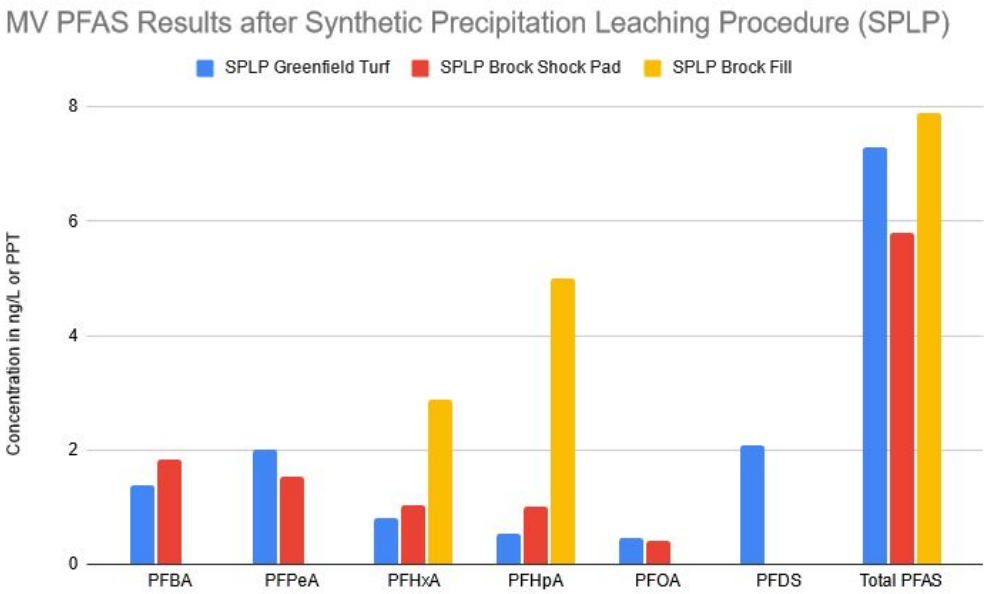
Perfluorobutanoic acid (PFBA) < 4.8 U
Perfluoropentanoic acid (PFPeA) < 4.8 U
Perfluorohexanoic acid (PFHxA) < 9.6 U
Perfluoroheptanoic acid (PFHpA) < 4.8 U
Perfluorooctanoic acid (PFOA) < 1.9 U
Perfluorononanoic acid (PFNA) < 4.8 U
Perfluorodecanoic acid (PFDA) < 4.8 U

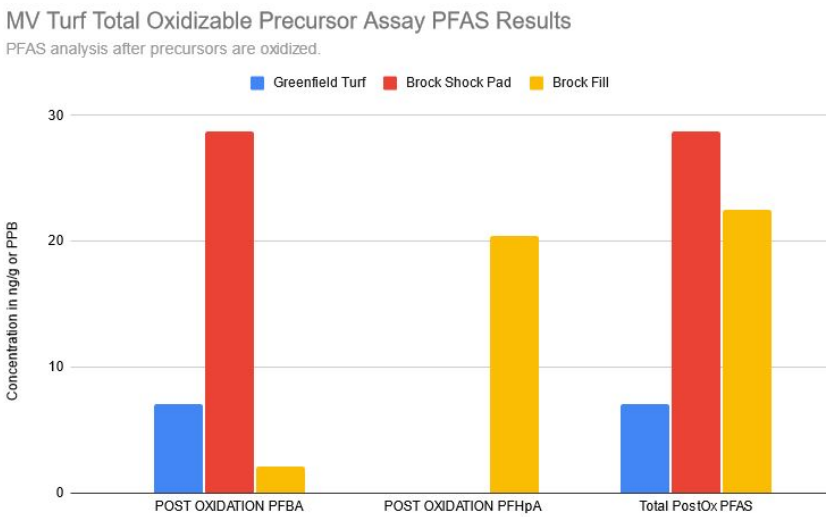
Notes and Abbreviations
PFAS: Per- and Polyfluoroalkyl Substances
SPLP: Synthetic Precipitation Leachate Procedure
U: Not Detected Above the MDL

So Hypothetically… If	
PFHxS	4.7
PFHpA	4.7
PFOA	1.8
PFOS	4.7
PFNA	4.7
PFDA	4.7
PFAS6 Total	25.3 ng/L

https://drive.google.com/drive/folders/1ZgqrqLKBRLMJr-PdG8GF7R0p26qUnvBO

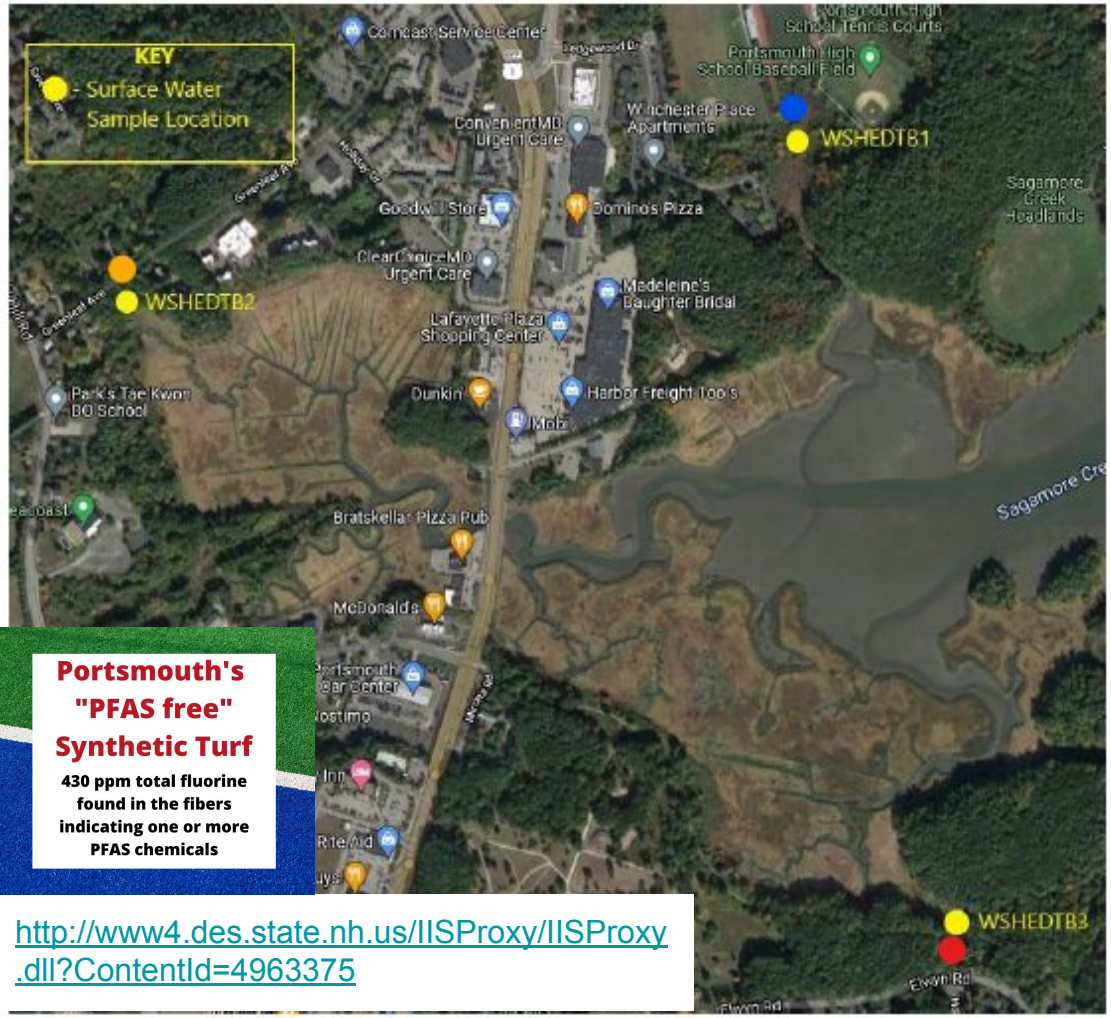
Field Component Test Results
Martha's Vineyard, MA





https://www.mvcommission.org/sites/default/files/docs/2021-02-26%20%28TurfAnalysisReport_FINAL%29.pdf

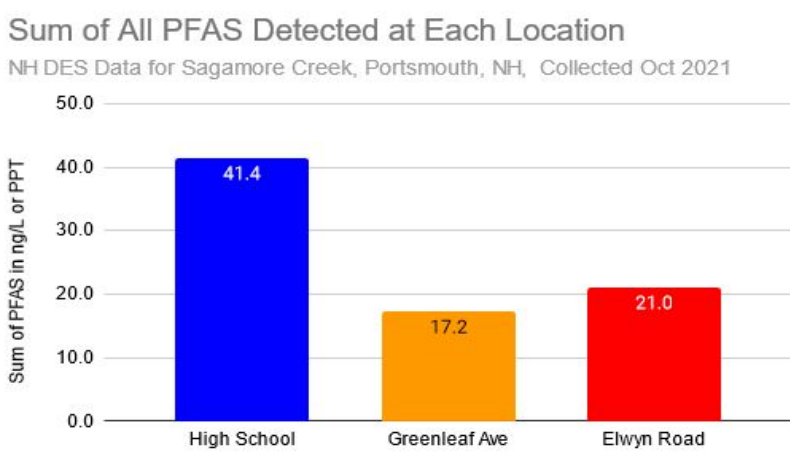
Real World Data
Portsmouth, NH

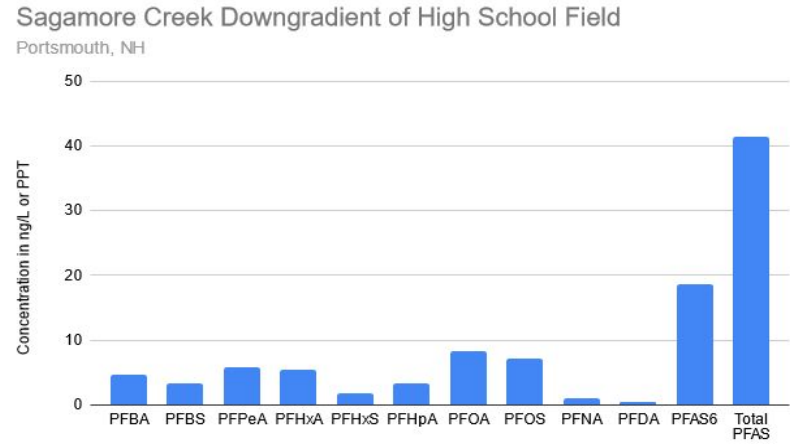


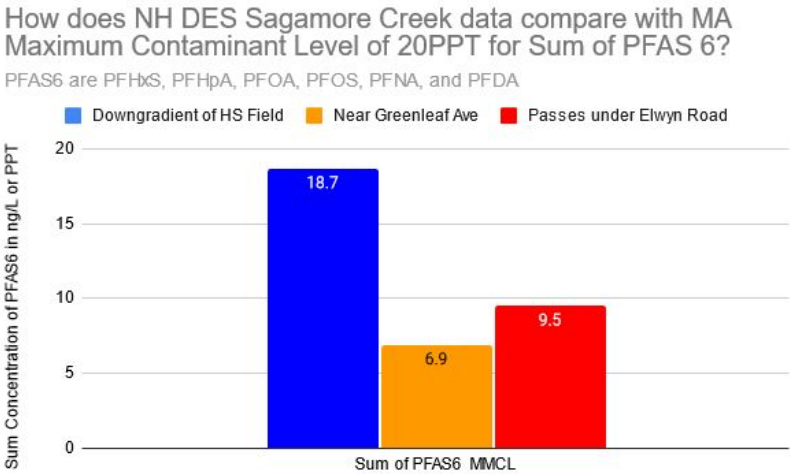
Portsmouth's "PFAS free" Synthetic Turf

430 ppm total fluorine found in the fibers indicating one or more PFAS chemicals

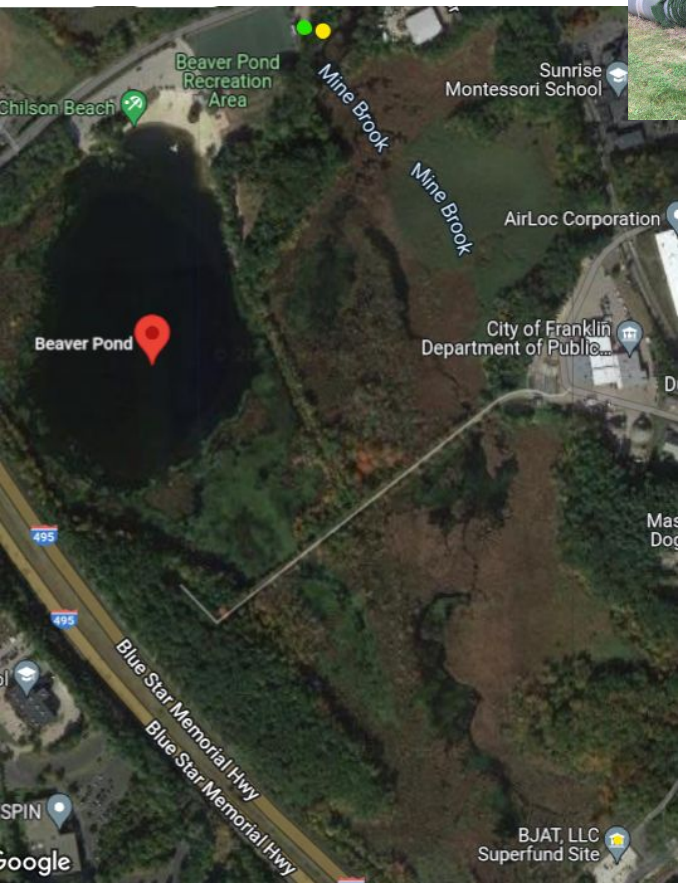
http://www4.des.state.nh.us/IISProxy/IISProxy.dll?ContentId=4963375

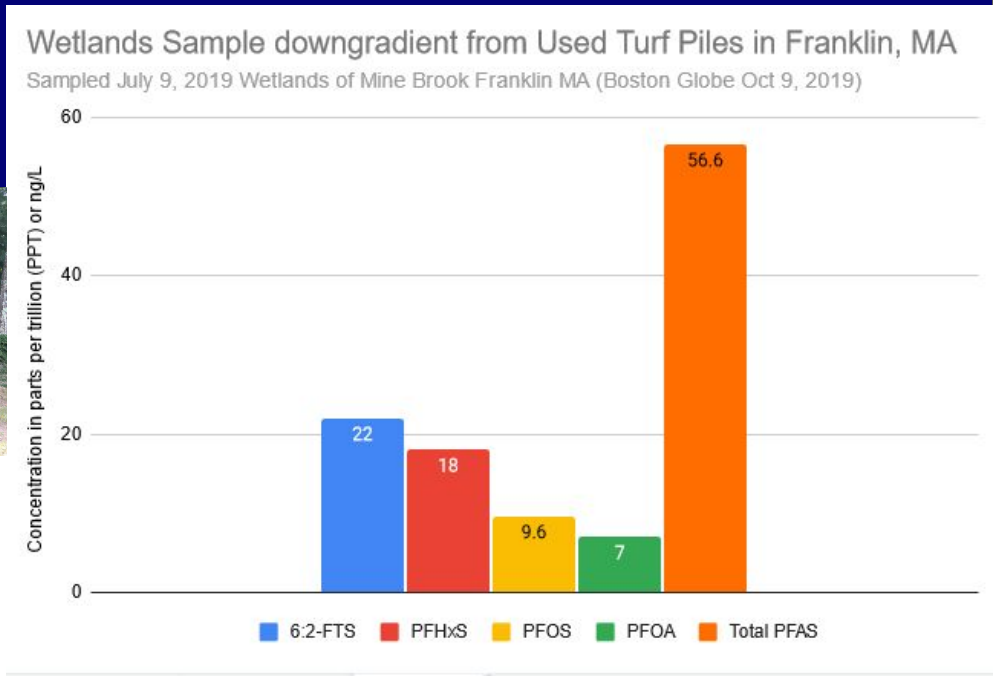


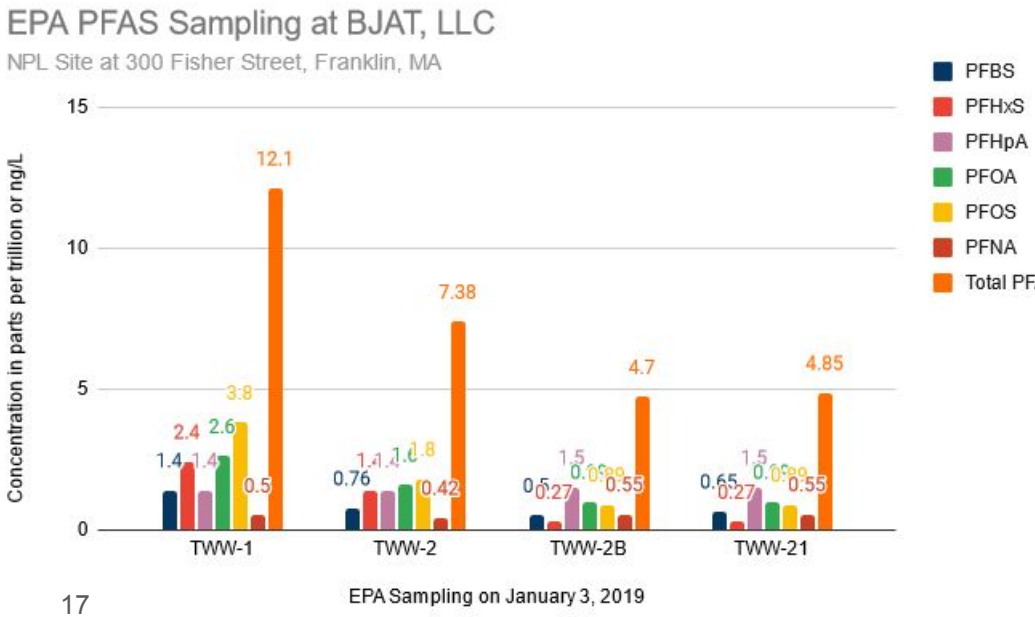




Real World Data
Franklin, MA

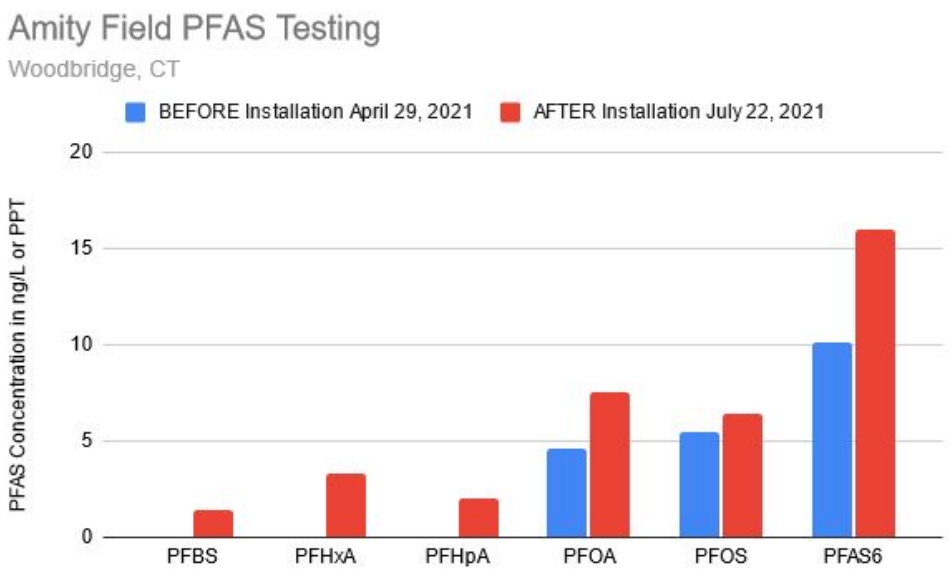






https://www.peer.org/wp-content/uploads/2019/10/10_10_19_Franklin_Wetland_Complaint-1.pdf

Real World Data
Woodbridge, CT



Metals: RCRA 6020	4/29/21	7/22/21
Arsenic	ND	ND
Barium	7.02 ug/L	6.99 ug/L
Cadmium	ND	ND
Chromium	ND	ND
Lead	ND	ND
Selenium	ND	1.18 ug/L
Silver	ND	ND

Neighbors File Appeal To Stop Artificial Turf Field

Date: September 03, 2020 | in: Top Stories, Town Depts. & Agencies

Two neighbors of Amity High School filed an appeal in New Haven Superior Court regarding the Town Plan and Zoning Commission decision to allow excavating and moving of earth materials for construction of an artificial turf field at the Johnson Football Field. The appeal states that the use of an athletic stadium employing artificial turf poses "unreasonable impacts to the health, safety and welfare of the community and the appellants."

https://woodbridgetownnews.com/neighbors-file-appeal-to-stop-artificial-turf-field/

Why are there PFAS in my turfgrass?

Graham Peaslee & Heather Whitehead

- We have screened dozens of different new and used turfgrass samples for total fluorine…
- Where does this fluorine come from?
- Likely that some fraction of PPAs sticks to or interlocutes in the plastic used in synthetic turf…
- We measure some short-chain PFCAs in run-off but there are a lot of polymer and polymer degradation products we do not measure by LC-MS/MS…

Unanswered Questions

Which PFAS are coming off the synthetic field system components? How much? How fast? By what mechanism(s)?

Eventual fate & transport? Bioavailability and toxicity?

How to safely recycle? How to phase out?

How to remediate?

Who is responsible?

Acknowledgements

Heather Whitehead, Jeff Gearhart, Tracy Stewart, Kyla Bennett, Rebekah Thomson, Diana Carpinone, Ayesha Khan, Ted Jankowski, Chandra Prasad, Susan Desmarais, Meegan Lancaster

NH DES

MassDEP

TURI

ITRC

Questions?