



City of Cambridge

Executive Department

YI-AN HUANG
City Manager

June 19, 2024

To the Honorable, the City Council:

In response to Awaiting Report No 24-022 requesting an update on City efforts related to PFAS concerns, we report the following:

PFAS are an incredibly complicated public health issue that require scientific rigor, new regulations, and an understanding and evaluation of risk. City staff are engaged in numerous areas, but much of the regulatory environment is driven **by federal and state research and regulations**. This is a **quickly moving conversation**, which staff are following closely and will continue to engage in.

This report provides an overview of

1. **BACKGROUND ON PFAS**
2. **EPA'S PFAS STRATEGIC ROADMAP**
3. **NEW FEDERAL REGULATIONS**
4. **CAMBRIDGE DRINKING WATER**
5. **CAMBRIDGE FIRE FIGHTING PRODUCTS**
6. **CAMBRIDGE TURF FIELDS**
7. **CAMBRIDGE WASTE STREAMS**
8. **ADDITIONAL OUTREACH TO RESIDENTS**

1. BACKGROUND ON PFAS¹

What is PFAS and why are they used?

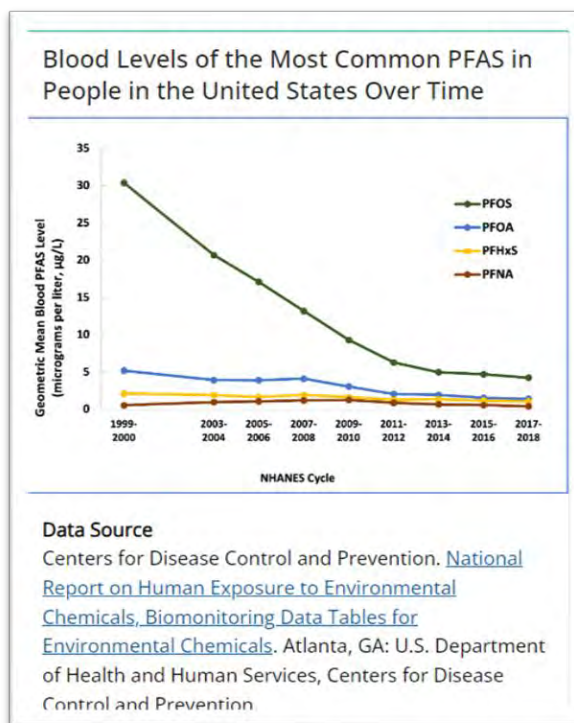
Per- and poly-fluoroalkyl substances (PFAS) are comprised of a class of thousands of synthetic chemical compounds containing a **carbon-fluorine bond (C-F), among the strongest bonds in chemistry**. These compounds as a group have **highly valued properties** like resistance to degradation at high temperatures and capacity to create low-friction (non-stick) surfaces used in hundreds of industrial processes, fire retardants, fabrics, cosmetics, consumer packaging and many other products.

PFAS compounds have been **manufactured and used in a wide range of industries since the 1940s, and many are still in use today**. After greatly increased concerns about human health effects in the late 1990s a major industry-wide agreement with EPA resulted in the **termination of production of several of the most hazardous compounds (PFOS and PFOA)** by the early 2000s. Since that time the **measured presence of these long-chain PFAS in US residents has declined between 70% to 85%**.

However, as PFOS and PFOA are phased out and replaced, people may be exposed to other PFAS.²

Because of its environmental persistence, high mobility in groundwater and wide use in many sectors, PFAS can be found in **surface water, groundwater, soil, and air** – from remote rural areas to densely-populated urban centers across the US. A growing body of scientific evidence shows that exposure even at very low exposures to certain PFAS compounds **can bind with cellular proteins and have been shown to cause suppression of reproductive and immune systems, developmental effects, elevated cholesterol, reduced vaccine efficacy and some cancer risk in humans** and other mammals. Despite these concerns, substituted **PFAS compounds are still used in a wide range of consumer products and industrial applications**.

While we wait for a clearer picture of the risks posed by exposure to many of these substitute PFAS compounds, the EPA has finally passed a series of new regulations including establishing extremely low standards in drinking water, better regulating new PFAS compounds, and requiring testing of PFAS in solid waste and wastewater streams to protect residents from the historic releases dating back decades and to prevent their further spread in the environment.



¹ PFAS Strategic Roadmap: EPA's Commitments to Action 2021 – 2024.

www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf Page 5.

² www.atsdr.cdc.gov/pfas/health-effects/us-population.html

How can I be exposed to PFAS?

“Nearly everyone in the world has some amount of PFAS in their blood. PFAS can get into our bodies when we:

- drink water from PFAS-contaminated municipal sources or private wells,
- eat foods produced near places where PFAS were used or made,
- eat fish caught from water contaminated by PFAS,
- eat food packaged in material that contains PFAS,
- swallow or breathe in contaminated soil or dust, or
- accidentally swallow residue or dust from consumer products containing PFAS such as stain resistant carpeting and water repellent clothing.

Research has suggested that **exposure to PFAS from today’s consumer products is usually low**, and, for most PFAS, showering, bathing, or washing dishes in water containing PFAS would also be low, especially when compared to exposures to contaminated drinking water.”³

2. **EPA’s PFAS STRATEGIC ROADMAP**

In 2021, the EPA developed the **PFAS Strategic Roadmap: EPA’s Commitments to Action 2021 – 2024**. The roadmap is an “ambitious **plan of action** to further the **science and research**, to **restrict** these dangerous chemicals from getting into the environment, and to immediately move to **remediate** the problem in communities across the county. EPA’s PFAS strategic roadmap is our plan to **deliver tangible public health benefits** to all people who are impacted by these chemicals – **regardless of their zip code or the color of their skin.**”⁴

“The roadmap is focused on 3 specific directives:

- **Research.** Invest in research, development, and innovation to increase understanding of PFAS exposures and toxicities, human health and ecological effects, and effective interventions that incorporate the **best available science**.
- **Restrict.** Pursue a comprehensive approach to **proactively prevent PFAS from entering air, land and water** at levels that can adversely impact human health and the environment.
- **Remediate.** Broaden and accelerate the **cleanup of PFAS contamination** to protect human health and ecological systems.”⁵

³ www.atsdr.cdc.gov/pfas/resources/pfas-faqs.html

⁴ PFAS Strategic Roadmap: EPA’s Commitments to Action 2021 – 2024.
www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf Page 1

⁵ PFAS Strategic Roadmap: EPA’s Commitments to Action 2021 – 2024.
www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf Page 5

3. **FEDERAL REGULATORY CHANGES.**

The EPA's PFAS Strategic Roadmap is using a **whole government approach**, so while much of the work is being led by EPA, other federal agencies are also involved including the FDA. There is much work remaining, but there has also been significant progress. Below are a few key recent federal regulatory changes associated with PFAS.

- a. **New PFAS:** "In May 2023, the EPA proposed a rule to ensure **that new PFAS go through a full safety review process before entering commerce**, which would eliminate eligibility for exemptions that had allowed some substances to go through an abbreviated analysis. In June 2023, the EPA also announced a **framework for evaluating PFAS** to ensure that new PFAS, or new uses of existing PFAS, do not pose risks to people's health and the environment before they are approved for use."⁶
- b. **Drinking Water.** On **October 2, 2020, MassDEP published its PFAS** public drinking water standard of **20 nanograms per liter (ng/L), or parts per trillion (ppt) for six PFAS:** PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA. MassDEP abbreviates this set of six PFAS as "**PFAS6.**"

On April 10, 2024, EPA announced **new federal drinking water regulations** 4.0 parts per trillion for PFOS and PFOA, and 10.0 ppt for several other PFAS species. With these new federal regulations, public water systems will have until 2029 to implement solutions that reduce PFAS if monitoring shows that drinking water levels do not meet these standards.

The new federal regulations are more stringent than the earlier Massachusetts regulations and also cover two additional PFAS (PFBS and GenX). **MassDEP will be proposing amendments to its PFAS regulations to be at least as stringent as the new federal standards.**⁷

As described in more detail in Section 4, **Cambridge's drinking water meets both the state and federal standards.**

- c. **Food Packaging.** In February 2024, FDA announced that "substances containing PFAS were no longer being sold into the US market for use as grease-proofing agents on **paper food packaging**. This result is the fulfillment of the **voluntary market phase-out** commitments made by manufacturers. This phase-out is **eliminating the primary source of exposure to PFAS from authorized food contact uses.**"⁸
- d. **Monitoring Wastewater Streams.** In December 2022, EPA outlined recommendations for **States to require testing, monitoring and source identification of PFAS** in the wastewater streams through National Pollutant Discharge Elimination System (NPDES)

⁶ EPA's PFAS Strategic Roadmap: Second Annual Progress Report, December 2023. Page 5.

⁷ www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas

⁸ Market Phase-Out of Grease-Proofing Substances Containing PFAS, www.fda.gov/food/process-contaminants-food/market-phase-out-grease-proofing-substances-containing-pfas

permits which are required under the Clean Water Act for discharges from Wastewater Treatment Plants (WWTP) like **MWRA’s Deer Island and the GLSD**.

The goal is to leverage NPDES permits to **reduce PFAS discharges to waterways at “the source** and obtain more comprehensive information through monitoring on the sources of PFAS.”⁹ This data will be used to **improve our understanding of PFAS in wastewater streams; assess risk; and develop policies, regulations,** and other tools to address PFAS contamination in biosolids. Through these permits, MassDEP is requiring quarterly **PFAS testing** for the influent, effluent, and sludge samples at WWTPs; as well as quarterly samples for significant industrial users. The data is available on the MassDEP’s website¹⁰.

4. CAMBRIDGE DRINKING WATER

Drinking water can be a significant exposure to PFAS and **Cambridge has been and continues to be in full compliance with all federal and state water quality standards,** including PFAS regulations.

a. Cambridge has been testing for PFAS since 2019.

b. In 2022, the **existing Granular Activated Carbon (GAC) filter media was replaced** with new GAC media, which **significantly reduced the level of PFAS in our finished water**. See the adjacent table for the most recent PFAS6 quarterly sample result for April – June 2024.

c. Throughout 2023, all of the City PFAS **sample results remained well below the 2020 Mass DEP regulations**. In addition, review of quarterly PFAS sampling results from 2023 through early 2024 indicate that Cambridge’s finished water **meets all the EPA requirements established in 2024** and would be in full compliance with the new federal regulation, **though they are not required to be met until 2029**.

Cambridge tap water:
Current information about PFAS testing **Q2 April-Jun 2024**
Test Results

PFAS Analyte PFAS6 (regulated)	Result ng/L (ppt)
Perfluorooctane Sulfonic Acid (PFOS)	ND
Perfluorooctanoic Acid (PFOA)	*TRACE
Perfluorohexane Sulfonic Acid (PFHxS)	ND
Perfluorononanoic Acid (PFNA)	ND
Perfluorohepatanoic Acid (PFHpA)	*TRACE
Perfluorodecanoic acid (PFDA)	ND
Sum of PFAS6 - compare to MassDEP MCL of 20 ng/L	ND

MCL = Maximum Contaminant Level
ng/L = nanogram per liter
ppt = parts per trillion
ND= not detected
PFAS = Per and Poly Fluoroalkyl Substances
*TRACE = trace amounts are present, but they are below the minimum concentration that can be reported as a quantified value.

⁹ www.epa.gov/system/files/documents/2022-12/NPDES_PFAS_State%20Memo_December_2022.pdf

¹⁰ [Energy & Environmental Affairs Data Portal \(state.ma.us\) eeaonline.eea.state.ma.us/portal#!/search/npdes](http://Energy & Environmental Affairs Data Portal (state.ma.us) eeaonline.eea.state.ma.us/portal#!/search/npdes)

5. CAMBRIDGE FIRE FIGHTING PRODUCTS

Certain firefighting products and some firefighting gear have been identified as key sources of PFAS across the country. With a **2023 Hazmat Grant** from the Department of Fire Services (DFS), the Fire Department received \$44,200 to fund the replacement of all firefighting foam containing PFAS. **As of June 7, 2024, all firefighting foam containing PFAS was removed from the city.**

In 2023, the City also replaced firefighter Nomex station wear with a **newer brand of station wear containing no Nomex**, removing all of those uniforms from in-service use. Though not all Nomex wear contains PFAS, the Fire Department chose to err on the side of caution and absorb the expense to replace the station wear.

6. CAMBRIDGE TURF ATHLETIC FIELDS

Artificial turf fields **provide significantly more playing time** than traditional natural fields, as they can be played on immediately after rain and damp periods. They also provide a **more even surface for athletes**. The City has worked to ensure that as turf fields are being replaced or newly installed they provide a high quality playing experience for users, meet or exceed current standards, minimize heat islands and are not manufactured or produced with PFAS.

We **continue to update our specification** with each new field or replacement field. The next field to be redone is **Field Turf 4 at Danehy Park**, which will be replaced this summer.

The updated specification includes:

- a. Certification by the manufacturer that it **does not use PFAS in materials or production methods**. There is also **independent testing** done of the material to confirm this certification.
- b. The **carpet material** is woven, not stitched, which makes it easier to recycle.
- c. The traditional crumb rubber infill is being replaced **with sustainable wood-fiber-sand mix**. This material is less of a nuisance, more environmentally friendly and **reduces surface temperatures by up to 20 degrees on hot days**.

This specification addresses many of the traditional concerns about turf fields and we are looking forward to having a completed installation in the City.

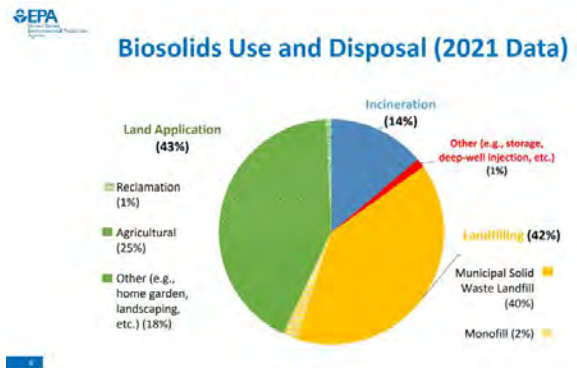
7. CAMBRIDGE WASTE STREAMS

Due to the continued manufacture and use of PFAS throughout society and industrial discharges, both wastewater and food waste contain some level of PFAS¹¹. Cambridge's wastewater is sent to MWRA's Deer Island and food waste is sent to the Greater Lawrence Sanitary District (GLSD). In both cases the facilities use anaerobic digestion whereby **microbes consume the food waste and wastewater solids to create biogas and biosolids.**

Anaerobic digestion significantly reduces the quantity of solids and captures the biogas to **generate clean energy to meet energy demands of the treatment facilities.** At GLSD **85% of Cambridge's food waste is converted to clean energy** allowing GLSD to be one of the very few wastewater treatment facilities that has **achieved net-zero emissions.** The remaining solids are converted into Class A biosolids, which are regulated by MassDEP and require a certification of Approval of Suitability. Since August 2020, MassDEP has required quarterly monitoring of PFAS in biosolids that are reused through land application. This data is uploaded to their website.^{12 13}

Biosolids from Wastewater Treatment Plants are either **beneficially reused for land applications, landfilled or incinerated**¹⁴.

“When biosolids are contaminated by PFAS through industrial, commercial and domestic sources, each management practice may pose potential risk.”¹⁵ The most significant sources of PFAS tend to come from paper mills and residuals, industrial cleaning products, metal coating facilities, consumer products (e.g., textiles), and car washes.¹⁶ **Regardless of how biosolids are disposed, a key priority is to reduce PFAS by addressing PFAS at the source before they get to the treatment plants.**



Even with new EPA and DEP rules for PFAS testing and reduction from drinking water and waste, the **complete removal of all PFAS compounds in our waste is not expected.** The most potentially hazardous PFAS compounds were largely phased out over the past 20 years in the US. But further reduction in exposure to thousands of unregulated PFAS compounds (even if less hazardous) will require a broad change of practice across nearly every industry. To that end, both **EPA and MassDEP are currently studying PFAS in WWTPs and biosolids** to improve our understanding of PFAS in wastewater streams; assess risk; and develop policies, regulations, and other tools to address PFAS contamination in biosolids¹⁷. **Study results are anticipated by the end of 2024.**

¹¹ EPA's Joint Principles for Preventing and Managing PFAS in Biosolids, July 24, 2023

¹² www.mass.gov/info-details/pfas-in-residuals and pubs.usgs.gov/publication/dr1160

¹³ eeaonline.eea.state.ma.us/portal#!/search/npdes

¹⁴ EPA Report: Biosolids Biennial report No. 9. Page 1.

¹⁵ *ibid*

¹⁶ EPA's Joint Principles for Preventing and Managing PFAS in Biosolids, July 24, 2023

¹⁷ EPA Tools and Resources Webinar, June 21, 2023. www.epa.gov/system/files/documents/2023-07/508%20Compliant%20-%20PFAS%20in%20Biosolids_Tobias%20%28final%29.pdf

8. ADDITIONAL OUTREACH TO RESIDENTS

One of the **significant exposures to PFAS** can be through **drinking water**. This is why the MassDEP and EPA have focused so much attention to updating the drinking water standards and why the City highlighted the work on PFAS in the **annual Drinking Water Quality Report**¹⁸ delivered to all customers in June 2024.



Update on PFAS Treatment and Analysis

Awareness about contaminants known as PFAS has increased as more testing and studies are undertaken to evaluate their effects on our environment. These chemicals are commonly found in a wide range of consumer goods and household products like cookware and food packaging due to their ability to resist water, grease, or stains. The PFAS family of chemicals are often referred to as "forever chemicals" because they degrade very slowly in the environment.



The Cambridge Water Department began monitoring for PFAS in our drinking water supply more than a year before Massachusetts enacted standards in 2020, and well before federal standards were established in April 2024. To proactively address PFAS, Cambridge conducted a pilot study replacing the existing granular activated carbon (GAC) media in our filters, a "best available technology" for PFAS removal.

The new media has been a success! Since the installation of the new GAC, PFAS has been below both the Massachusetts and federal standards for over a year. To keep PFAS levels low and in compliance with all federal and state standards, we began a second round of GAC media replacement in April 2024 – resulting in our second quarter regulatory samples coming back as non-detect. We are in the process of becoming a certified laboratory for PFAS analysis (see our new analyzer shown above), furthering our ability to stay ahead of this emerging contaminant through real-time PFAS analysis of both our water supply and throughout the water treatment process.

The EPA has also developed infographics that provide a high-level overview of PFAS in an accessible format.

¹⁸ www.cambridgema.gov/-/media/Files/waterdepartment/labfiles/2023AnnualDrinkingWaterQualityReport.pdf

PFAS Explained:



Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals.



What are PFAS?

PFAS are manufactured chemicals that have been used in industry and consumer products since the 1940s. Because of their widespread use and their persistence in the environment, many PFAS are found in the blood of people and animals all over the world. There are thousands of different PFAS, some of which have been more widely used and studied than others.



Are PFAS safe?

Research is ongoing to determine how exposure to different PFAS can lead to a variety of health effects. Studies have shown that exposure to certain levels of PFAS may lead to:



Cancer Effects
Increased risk of some cancers, including prostate, kidney, and testicular cancers.



Weight Effects
Increased cholesterol levels and/or risk of obesity.



Immune Effects
Reduced ability of the body's immune system to fight infections.



Developmental Effects
Low birth weight, accelerated puberty, bone variations, or behavioral changes.



Reproductive Effects
Decreased fertility or increased high blood pressure in pregnant women.

The more we learn about PFAS chemicals, the more we learn that certain PFAS can cause health risks even at very low levels. This is why anything we can do to reduce PFAS in water, soil, and air, can have a meaningful impact on health. EPA is taking action to reduce PFAS in water and in the environment. You can also take action if you remain concerned about your own risk.

Read on to learn where PFAS are coming from, how EPA is taking action on PFAS, and what actions you can take.

PFAS Explained:



Where are PFAS found?

Most people in the United States have been exposed to some PFAS. People can be exposed to PFAS by touching, drinking, eating, or breathing in materials containing PFAS. PFAS may be present in:

 Drinking Water An important potential source of PFAS exposure.	 Waste Sites Soil and water at or near landfills, disposal sites, and hazardous waste sites.	 Fire Extinguishing Foam Used in training and emergency response events at airports and firefighting training facilities.	 Facilities Chrome plating, electronics, and certain textile and paper manufacturers that produce or use PFAS.
 Consumer Products Stain- or water-repellent, or non-stick products, paints, sealants, and some personal care products.	 Food Packaging Grease-resistant paper, microwave popcorn bags, pizza boxes, and candy wrappers.	 Biosolids Fertilizer from wastewater treatment plants used on agricultural lands can affect ground and surface water.	 Food Fish caught from water contaminated by PFAS and dairy products from livestock exposed to PFAS.

Very little of the PFAS in water can get into your body through your skin, so, showering, bathing, and washing dishes in water containing PFAS are unlikely to significantly increase your risk.

EPA's researchers and partners across the country are working hard to understand how much PFAS people are exposed to and how.



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Keep reading to find out how EPA is taking action on PFAS.

The City and the Public Health Department will **continue to develop outreach materials** to provide information to residents about **how to reduce their exposure to PFAS from the most important sources**. This information will build off the excellent material available on the EPA website and elsewhere. One of the **significant challenges** for residents and for outreach materials is that our **understanding of PFAS and the regulatory environment continues to change so quickly**.

Very truly yours,

Yi-An Huang
City Manager