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massachusetts water works association

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May 26, 2023

Mr. Michael S. Regan, Administrator
U.S. Environmental Protection Agency
EPA Docket Center, OLEM Docket, Mail Code 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Docket ID No. EPA-HQ-OW-2022-0114 - National Primary Drinking Water Regulation Rulemaking for per- and polyfluoroalkyl substances (PFAS)

Dear Administrator Regan:

The Massachusetts Water Works Association (MWWA) is a non-profit organization representing more than 1,400 water supply professionals across Massachusetts. **Let us state unequivocally for the record that public health protection is the primary mission and goal of all Public Water Systems (PWS)**. This role is taken very seriously and PWS work diligently to ensure that the water provided to our residents and businesses meets all Safe Drinking Water Act (SDWA) standards. In Massachusetts, we take great pride in the fact that according to the Environmental Protection Agency's (EPA) own statistics for Quarter 1 of 2023, **96% of community water systems met all applicable health-based standards and 91% of the population served by community water systems received drinking water which met all applicable health-based drinking water standards.**

We are providing the following comments on EPA's proposed National Primary Drinking Water Regulation Rulemaking for per- and polyfluoroalkyl substances (PFAS). We note that EPA has engaged in rulemaking on several major rules impacting the water sector concurrently. With public comments all due within the past month, it is challenging to give each rule the thorough review it requires. This regulation is complicated, with new concepts not well understood by the drinking water profession. We are discouraged that EPA denied our request to extend the public comment period to give more time for thoughtful review on a regulation that will have substantial impact on our industry, management of our water resources, and the customers we serve. We fully support efforts to expand verified public health protections, but EPA needs to consider the challenges

associated with implementation of the proposed PFAS rule before finalizing these standards.

General Comments:

MWWA and its members are very comfortable offering our expertise and opinions as they relate to the very real impact that the proposed drinking water standards will have on our operations and related services. However, our ability to offer comments and opinions on more nuanced toxicological principles is well beyond our area of expertise. We are not toxicologists, nor epidemiologists, so we will leave it to other experts to comment on the appropriateness of the standards from a public health protection standpoint. We do know that while EPA is moving forward with drinking water standards, health studies and exposure assessments are still ongoing[1] by the Centers for Disease Control and the Agency for Toxic Substances and Disease Registry to *"provide a better scientific understanding about the relationships between PFAS exposure and certain health outcomes and help people understand their risk for health effects."*[2]

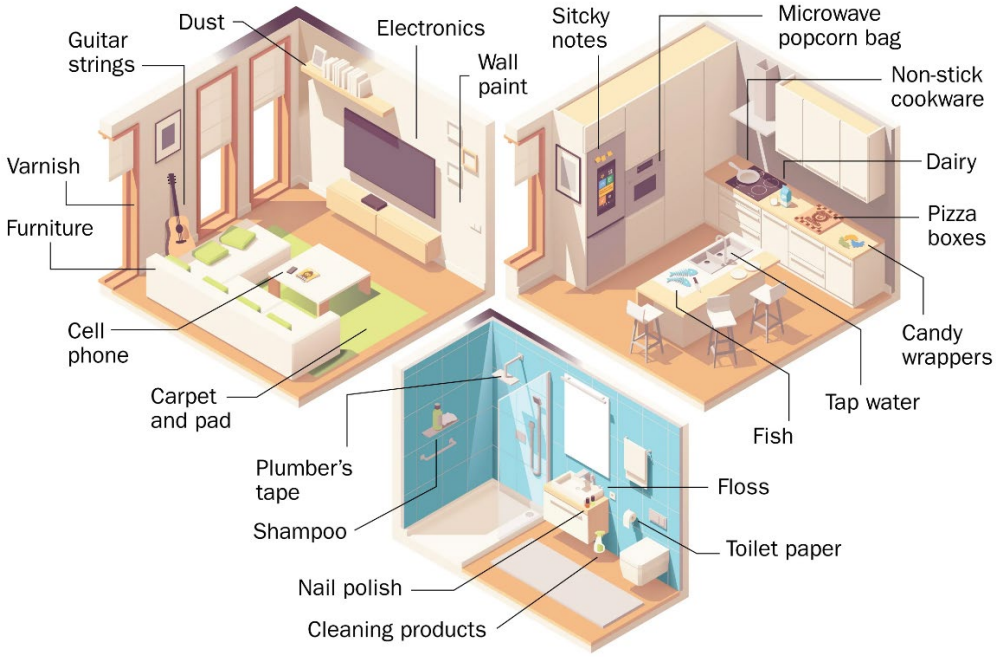
EPA's health advisories for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) are still considered "interim" and the Science Advisory Board (SAB) made several recommendations (EPA-SAB-22-008)[3] when they reviewed EPA's scientific justification for setting the standards. On its website, EPA states *"In the proposed rule, EPA presents updated noncancer toxicity values based on evaluating additional scientific information. These updated values are different from those used to calculate the 2022 interim HAs, which EPA based on the best available science at that time. EPA is accepting public comments on its proposed NPDWR, including on the proposed maximum contaminant level goals (MCLGs), other supporting information, and the draft 2023 toxicity values for PFOA and PFOS which are based on the best available science. Note that the MCLGs in the proposed rule are zero.* ***The 2022 interim Health Advisories for PFOA and PFOS will continue to remain available as EPA finalizes a national primary drinking water regulation for those contaminants.***" It does not appear that EPA reconvened the SAB to discuss how they responded to the SAB's recommendations; MWWA recommends that those experts be convened to re-review EPA's new rationale. If EPA drops its health advisories because of this rulemaking process, there should be reasoning provided to the public for why the values are now different than the Interim Health Advisory levels. There was much press generated around the Interim Health Advisories in the parts per quadrillion, and as we will discuss later in our comments, communication related to PFAS is important. MWWA knows that PFAS contamination concerns are contributing to a loss of public confidence in tap water. If there has been a change to the way that EPA is viewing the science, the public deserves to hear in plain language why contaminants that were once deemed dangerous at parts per quadrillion are now being regulated with MCLs in the parts per trillion.

[1] https://www.atsdr.cdc.gov/pfas/activities/studies.html

[2] https://www.atsdr.cdc.gov/pfas/activities/pease.html#anchor_45429

[3] https://sab.epa.gov/ords/sab/f?p=100:0:11519146227520:APPLICATION_PROCESS=REPORT_DOC:::REPORT_ID:1105

The proposed drinking water standards are based on the default assumption that 20% of a person's exposure is allocated to drinking water, while 80% is comprised of all other potential exposure pathways. We question why drinking water seems to be the sole focus of regulation while potentially higher PFAS exposures exist in consumer products (including food packaging[4], stain- and water-repellent fabrics[5], nonstick products, polishes, waxes, ski wax[6], paints, cleaning products), food[7], personal care products/makeup[8], pesticides, and dust[9], and these potential sources of exposure are not simultaneously being regulated. Time magazine has an excellent graphic[10] depicting all these points of exposure (GRAPHIC 1).



GRAPHIC 1: ***There aren't many places in your home that are PFAS-free. Lon Tweeten for TIME; Getty Images***

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[4] Susmann, H.P., L.A. Schaider, K.M. Rodgers, R.A. Rudel. 2019. "Dietary Habits Related to Food Packaging and Population Exposure to PFASs," Environmental Health Perspectives. DOI: 10.1289/EHP409

[5] https://toxicfreefuture.org/wp-content/uploads/2022/08/toxic-convenience.pdf

[6] https://www.epa.gov/system/files/documents/2022-01/pfasskiwax.pdf

[7] https://www.fda.gov/food/process-contaminants-food/testing-food-pfas-and-assessing-dietary-exposure#:~:text=PFAS%20can%20also%20enter%20the,PFAS%20entering%20the%20food%20supply.

[8] https://www.fda.gov/cosmetics/cosmetic-ingredients/and-polyfluoroalkyl-substances-pfas-cosmetics

[9] Schildroth, S., K.M. Rodgers, M. Strynar, J. McCord, G. Poma, A. Covaci, R.E. Dodson. 2022. Per-and polyfluoroalkyl substances (PFAS) and persistent chemical mixtures in dust from U.S. colleges. Environmental Research. 206. https://doi.org/10.1016/j.envres.2021.112530. Article

[10] https://time.com/6281242/pfas-forever-chemicals-home-beauty-body-products/?utm_source=twitter&utm_medium=social&utm_campaign=editorial&utm_term=health_environment&linkId=215849297

We note that there was a study[11] of rainwater conducted by the National Atmospheric Deposition Program and the highest total concentration of PFAS was nearly 5.5 parts per trillion (ppt) in a single sample from Massachusetts. ***We have higher concentrations of PFAS falling from the atmosphere than EPA's proposed drinking water standards.*** If we are to have meaningful health risk reduction shouldn't the Biden Administration be truly taking a whole of government approach in addressing PFAS exposure by identifying and regulating all means of PFAS exposure simultaneously? Addressing only 20% or less of a person's potential exposure while the remaining 80% of exposure is allowed to continue unfettered seems irresponsible and an ineffective public health strategy.

We are concerned that in the interest of rapid implementation of drinking water standards, the burden of paying for treatment will fall to ratepayers when it should be falling to the polluters to remediate the damage they have caused. When the Clean Water Act and the Safe Drinking Water Act were passed in the 1970's, Congress felt progress toward regulatory compliance was of utmost importance and robust grant programs were established (to the tune of 90% grants) to support the construction of treatment plants and treatment works. That same level of commitment does not exist today. The Biden Administration points to funding available through the Bipartisan Infrastructure Law (BIL) as a means to lessen the burden. However, BIL funding will cover only a small fraction of what we anticipate our PWS will need in order to comply with the proposed PFAS rule. The total allocation of BIL funding proposed for Massachusetts was **just** $1.2 billion across **all** programs[12] including Drinking Water State Revolving Fund Supplemental, Lead, Drinking Water Emerging Contaminants, Clean Water Supplemental, and Clean Water Emerging Contaminants. Lead funding for Massachusetts is now expected to be reduced by almost one-half because of reallocation after the 7th Drinking Water Infrastructure Needs Survey and Assessment.

Further, there are major backlogs of infrastructure needs in Massachusetts and across the country which require significant investment to maintain public health. EPA's most current estimate for Massachusetts was recently released, the 7th Drinking Water Infrastructure Needs Survey and Assessment[13], and this report shows $15 billion is needed over the next 20 years; and this estimate doesn't include any costs associated with complying with the proposed PFAS standards. We will identify costs being incurred by PWS in Massachusetts later in our comments, but we call on Congress and the Biden Administration to fully fund the treatment and ongoing operations and maintenance (O&M) costs necessary to remediate PFAS in our nation's drinking water and seek reimbursement from the manufacturers who have caused this problem. The federal government has far more resources and abilities to pursue legal actions and seek reimbursements from PFAS manufacturers than do individual PWS or groups of PWS.

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[11] https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/568254
https://dnr.wi.gov/topic/Contaminants/documents/wispac/WSLHPresentation20200116.pdf

[12] https://www.mass.gov/doc/clean-water-and-drinking-water-state-revolving-funds-and-the-bipartisan-infrastructure-law-presentation/download

[13] https://www.epa.gov/system/files/documents/2023-04/Final_FAQ_DWINSA_4.4.23.v1.pdf

MWWA's comments to EPA draw on our actual experiences in complying with PFAS drinking water standards, as Massachusetts set drinking water and groundwater clean-up standards prior to the release of EPA's proposed PFAS standards. In October 2020, the Massachusetts Department of Environmental Protection (MassDEP) promulgated a Massachusetts Maximum Contaminant Level (MMCL) of 20 ppt for any one, or the sum, of six PFAS compounds: perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorodecanoic acid (PFDA), hereafter referred to as PFAS6.

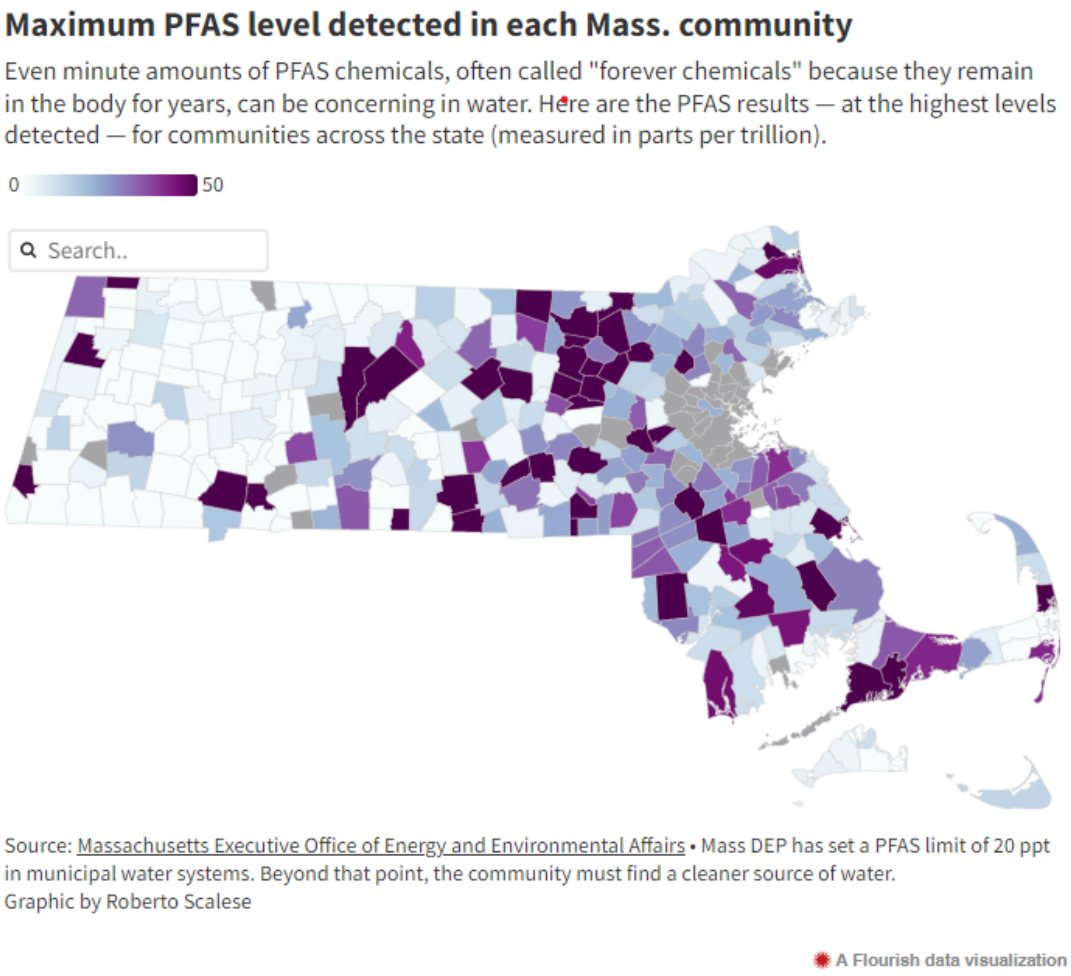
EPA needs to carefully consider the implementation challenges for PWS caused by regulatory efforts related to PFAS which we will outline below. MWWA is not sure that EPA has put enough time into this effort before moving forward with the proposed drinking water regulations. Without adequate consideration regarding these implementation challenges, public confidence in drinking water could be further jeopardized. **EPA must address these challenges before finalizing the rule.** We hope that EPA will fully consider the information we are providing on behalf of Massachusetts PWS and will craft a final rule that is reasonable in its expectations of implementation and schedule.

Occurrence:

Testing under the Unregulated Contaminant Monitoring Rule (UCMR) program is and has always been an important step in the EPA rulemaking process. The occurrence data collected through this monitoring is used to support decisions to regulate particular contaminants in the interest of public health. The UCMR5 program just commenced at the beginning of this year (2023); therefore, EPA cannot possibly have a full sense of occurrence for the suite of PFAS compounds in drinking water. EPA's regulatory determination for perfluorohexane sulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA) and its ammonium salt (also known as a GenX chemicals), perfluorononanoic acid (PFNA), and perfluorobutane sulfonic acid (PFBS) are based on a very limited data set and could only be enhanced by waiting for the results of UCMR5 to provide a more robust data set for determining occurrence across the nation. EPA should delay promulgation of this rule until it has an opportunity to vet at least one full year of data obtained through UCMR5.

Because Massachusetts has a drinking water standard, we have sampling results for PFAS detected under Method 537 or 537.1. A local media outlet, WBUR, created a map (GRAPHIC 2) which provides a good graphical representation of detections in Massachusetts; this is useful for looking at the extent of PFAS in Community (COM), Non-Transient Non-Community (NTNC), and Transient Non-Community (TNC) PWS across the Commonwealth.[14]:

[14] https://www.wbur.org/news/2023/02/14/pfas-pfoa-massachusetts-drinking-water-clean-up

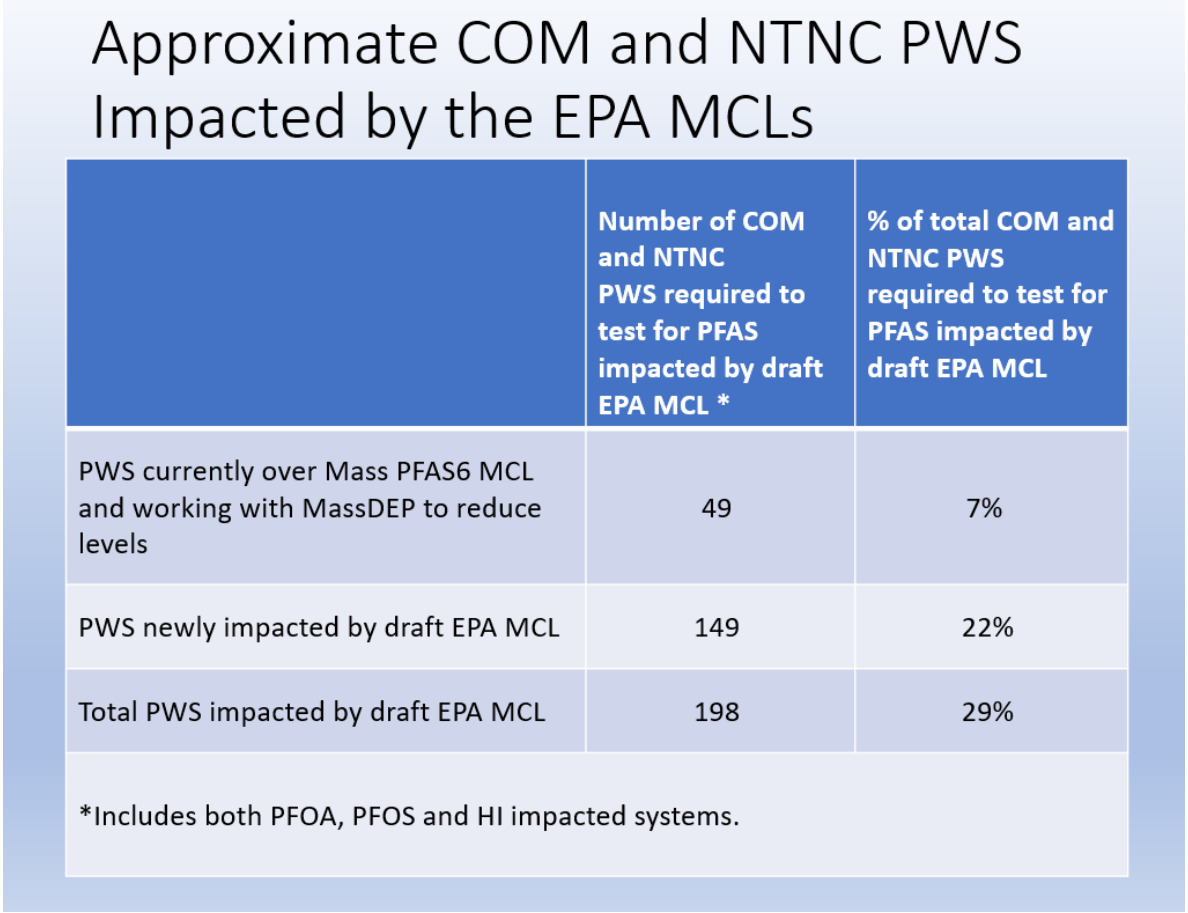


GRAPHIC 2: Map produced by WBUR of maximum PFAS level detected in each Massachusetts Community based on results from the Executive Office of Energy and Environmental Affairs data portal.

Data shows that 170 PWS have detected PFAS6 above the MMCL. MassDEP has looked at Massachusetts PWS sampling results and determined that 29% of our Community and Non-Transient Non-Community PWSs could be impacted by the draft EPA PFAS MCL. Some PWS in Massachusetts have already addressed PFAS to comply with the MMCL of 20 ppt for PFAS6; however, they will likely have to do even more to comply with EPA's proposed PFAS standard, which are lower than the MMCL. Those numbers are not reflected in MassDEP's chart of the potential universe of impacted PWS. MassDEP acknowledged to MWWA in a phone conversation[15] that it may have underestimated the number of systems impacted if it was to revisit those PWS already in compliance with the MMCL. Here is the data that MassDEP presented in a webinar on April 10, 2023 (GRAPHIC 3)[16].

[15] Jennifer Pederson, MWWA Executive Director, phone conversation on April 21, 2023 with Margaret Finn, PFAS Lead for MassDEP's Drinking Water Program

[16] https://www.mass.gov/doc/presentation-on-epa-proposed-mcls-for-pws/download



GRAPHIC 3: MassDEP presentation slide showing the approximate number of Community (COM) and Non-Transient, Non-Community (NTNC) Systems impacted by EPA's proposed MCLs.

Further, because MassDEP requires PWS to ensure that their laboratory uses a lower Method Detection Limit (MDL) of 2 ppt, MassDEP stated that 317 COM, NTNC and TNC PWS have detected PFOA and/or PFOS > 2 ppt but < 4 ppt at one or more of their finished water sources.

Staff from the Massachusetts office of Kleinfelder analyzed the data from the Massachusetts Executive Office of Energy and Environmental Affairs data portal and found that 45% of COM PWS in Massachusetts had detections above 4 ppt of PFOA/PFOS.[17]

MassDEP was instructed by the Massachusetts legislature to conduct sampling of private wells for PFAS. The agency concentrated its efforts in towns that are predominantly served by private wells and offered a voluntary sampling program. Of the private wells tested, there were 311 private wells that had PFAS6 detections above 4 ppt.

[17] Presentation by Ben Powers, EIT, Kleinfelder, "PFAS Treatment in New England: A Regional Survey," April 2023, New England Water Works Association, Spring Conference

Regulated Entities:

EPA proposes that Community Water Systems and Non-Transient, Non-Community Water Systems will be subject to this proposed regulation. Due to EPA's high level of concern regarding drinking water as an exposure pathway, MWWA believes that the standards should also apply to Transient Non-Community PWS where employees could be drinking the water every day. In addition, if reducing/eliminating public exposure to PFAS through drinking water is considered this urgent, MWWA wonders why the Biden Administration is not moving forward with regulations (under the appropriate agency's regulatory authority, if not EPA) to require testing and remediation of private wells. The inhabitants of a home where drinking water is supplied from a private well are utilizing water in the same manner as customers served by a PWS. Similarly, the Food and Drug Administration should be regulating PFAS in bottled water. If PFAS is as dangerous as EPA is suggesting, we contend that the EPA and the states' regulatory agencies should be as concerned about private well owners and bottled water consumers as they are about customers of PWSs and work with other governmental agencies to find the appropriate regulatory mechanisms to require PFAS protections for **all** water consumers.

Sampling Protocols & Training:

PFAS sampling requires unique protocols that are extremely sensitive to prevent cross-contamination. Our PWS have been instructed to take precautions such as avoiding use of sharpie markers, sticky notes, and plastic clipboards; not to wear waterproof or stain-repellant clothing; not to use fabric softener on clothing to be worn in field, not to use cosmetics, moisturizers, hand cream, sunscreen, or other personal care products the morning of sampling, etc. All these precautions cause us to be concerned that samples may easily be contaminated. When considering enforceable regulatory limits in the low parts per trillion, barely above a laboratory's capability to reliably detect and quantify these compounds, cross contamination must be considered a significant problem. EPA must have protocols in place to invalidate samples with PFAS detections that may be a result of human error through sample collection, improper shipping practices, or other avenues. EPA and primacy states must ensure that PWS have training on proper sampling protocols and provide the appropriate technical assistance and outreach to PWS once the rule is implemented.

Certified labs have been challenged with analyzing the number of samples that Massachusetts PWS send them. PWS can wait upwards of three weeks for sample results and then MassDEP must perform quality assurance evaluations, which can take several more weeks. Samples are expensive ($250-$350 per sample), with field blanks being run in most cases, thereby doubling the costs. Follow-up confirmatory samples will be needed to validate initial results. MWWA recommends that, as Massachusetts did, monitoring should be phased-in by system size to reduce the resource burden on the labs and primacy agencies who must review and verify the quality of the data. Nationwide laboratory capacity to perform the increased analysis also needs to be evaluated and additional laboratories will need to be approved and certified.

Source Water and Analytical Variability:

Through the years of sampling that has been conducted by Massachusetts PWS, it is not uncommon for different labs to report a difference of several parts per trillion +/- in PFAS when analyzing the exact same source water. We question whether we are pushing the sensitivity of the equipment to a point where it cannot be reliably quantified. A sample is considered valid at +/-30%. When discussing regulatory compliance levels in the low parts per trillion, this is quite concerning. As a point of illustration, the following are split sample results for a utility in Massachusetts. On a sample date of 12/11/2020, lab A's result was 12.7 ppt, while lab B's result was 20.56 – both were valid results, yet the swing was 7.86 ppt. This analytical variability is well over what EPA proposes as the MCL, so PWS could be subject to noncompliance and enforcement actions due to analytical variability alone. For this reason, we also do not recommend going to two significant figures to determine compliance values. MassDEP was initially going to count values below the Method Reporting Limit toward compliance with the MMCL but dropped that approach in its final rule. We recommend that EPA consider all results below the Practical Quantification Limit be considered 0 ppt.

Some Massachusetts PWS have seen +/- parts per trillion variability in PFOS and PFOA concentrations when collecting monthly samples. Even a 1-2 ppt variation can represent over 40% variability when close to the MDL. It is difficult to tell if this variability is attributable to changes of PFOS and PFOA concentrations in the source water or if it is linked to the variability of the analytical method (+/- 30%). Having a proposed Rule Trigger Level of 1/3 the PFOS and PFOA MCL or Hazard Index may have PWS and primacy agencies fluctuating back and forth on whether the PWS is eligible for a monitoring waiver. These variations may also impact the running annual average calculation. This uncertainty creates unnecessary complexity, increased level of effort, and possible erosion of public confidence. Importantly, the proposed approach to use results below the PQL, which are unreliable with questionable accuracy and not available to all PWSs due to the lab capacity, is inappropriate to determine reduced monitoring eligibility. This sets a precedent for using results that are inaccurate and not equally achievable for driving regulatory decisions. MWWA recommends following the Standard Monitoring Framework (SMF) where all results below the PQL are considered 0 ppt.

We are also aware of several instances where it was found that lab instrumentation was not properly cleaned between sample runs, resulting in erroneous detections. It is paramount that labs are not conducting cross matrix analysis on instruments that analyze drinking water samples.

Analytical Methodology:

There must be leeway in the rule to utilize any current or future EPA approved analytical methods. In Massachusetts, our regulations are so prescriptive that PWSs have not been able to utilize Method 533 because it had not yet been approved by EPA at the time our regulations were drafted. We believe there will be advancements in analytical technology and the rule should be flexible enough to incorporate future approved methods for PFAS analysis.

Treatment Considerations:

EPA is proposing MCLs for PFOA and PFOS at 4 ppt and a Hazard Index approach for four other PFAS compounds: PFHxS, HFPO-DA/GenX, PFNA, PFBS with a MCL of 1.0 (unitless) Hazard Index. MWWA is unfamiliar with the Hazard Index approach. While perhaps common in the EPA's CERCLA program and the Massachusetts Waste-Site Clean-up program, it has never been used before under the SDWA. We are concerned that a cumulative regulatory approach ignores the complexities of selecting, implementing, and operating the appropriate and affordable PFAS treatment solutions. We are also concerned about the uncertainties that exist if EPA decides to regulate more PFAS compounds in the future under the Hazard Index.

There are a limited number of drinking water treatment technologies that are currently known to be effective for PFAS removal. However, there is no one-size-fits-all solution. Depending on several site-specific factors, such as the concentrations and types of PFAS present in the source water(s), general water quality characteristics, and existing treatment processes, treatment technologies may show different removal effectiveness for the varying carbon chain lengths and attached functional groups. EPA needs to provide flexibility within this regulation to allow for expansion of treatment options as technology progresses. Advancement in Best Available Technologies (BATs) will be made, and EPA and primacy states need to be positioned to swiftly approve new BATs. It is recommended that EPA and primacy states streamline their new technology review process to grant approvals more quickly. In Massachusetts, MassDEP required new technology approval for Granulated Activated Carbon (GAC) which required manufacturers, consultants, and PWS to jump through hoops that MWWA believes were unnecessary given that GAC has been widely used in water treatment and is one of only a few proven technologies for removing PFAS.

If a cumulative approach is taken by EPA using the Hazard Index, the potential for drinking water noncompliance from the presence of individual PFAS in single digit ppt levels will impose significant operational challenges for running PFAS treatment systems. Increased spent adsorptive media will be generated requiring disposal or incineration from more frequent change-outs. With adsorptive media technologies that are commonly used for PFAS treatment, such as granular activated carbon (GAC) and anion exchange (AIX) resin systems, water is sampled from the different media bed depths to detect breakthrough of PFAS, along with monitoring of the finished water levels. When breakthrough of the media is approaching the PFAS limit, the system requires a change-out with new media. Media change-outs are costly, and therefore should be based on accurate analytical results. MWWA is concerned that low parts per trillion accuracies will be difficult to achieve and may cause inefficient use of resources such as requiring an excessive number of PFAS samples to ensure accurate results.

There is significant engineering effort and cost that goes into selection of the appropriate treatment technologies for a given water system. Site-specific testing, either bench-scale or pilot-scale, that evaluates the effectiveness of the treatment technologies for the actual contaminated water and an associated cost analysis are

critical for 1) identifying the appropriate treatment solution for that specific water and existing treatment processes; 2) selecting the cost-effective alternative; and 3) identifying and avoiding any potential unintended consequences that are inherently possible when any new water treatment process is added (e.g. although this is a very infrequent occurrence, coal-based carbon has been observed to release arsenic under certain water conditions)[18]. While such testing provides critical design parameters and potential cost-saving measures, it takes significant time. Designing and building permanent PFAS treatment facilities – assuming timely approval from MassDEP, and local permitting – is a lengthy process[19]. Renting temporary treatment equipment similarly is costly and time-consuming. These challenges should be considered in EPA's timeframe for enforcing PFAS standards in drinking water. It will be very difficult for PWS to come into compliance with this rule within the three-year window EPA is proposing.

If a PWS must install treatment to address PFAS in their drinking water, it may cause the classification of their system to change, necessitating higher-grade licensed operators. In Massachusetts and other states, operators sitting for higher-grade licenses have course requirements before they can even sit for the exams. EPA and primacy states must recognize that this will cause staffing issues and will need to provide compliance forbearance and flexibility for the operators to obtain the necessary licenses. Many PWS are already struggling to attract and retain appropriately licensed staff and the industry expects to lose many operators to retirement in the next five years. Some PWS in wealthier communities may, through higher salaries, be able to lure currently licensed operators from other systems that cannot compete with higher wages. These less wealthy PWS often have significant Environmental Justice populations that could be put at risk due to lack of certified water treatment operators. PWS are already struggling to maintain staffing levels and that problem will be exacerbated by this proposed PFAS MCL.

In some instances, Massachusetts PWSs have been advised to take sources out of service so that finished water PFAS concentrations are below the MMCL. This option will not be possible for most water systems. Some water systems have limited sources and those sources may be constrained by other regulatory programs that govern water withdrawal quantities (in Massachusetts, this is the Water Management Act). Flexibility for limited use of impacted sources during peak demand periods may be necessary for public safety (adequate pressure and fire protection) or to maintain reasonable operating costs while permanent solutions are implemented. For this reason, we support determining compliance on a running annual average.

Regional connections are a possibility to achieve compliance, but interconnections with neighboring communities to provide an alternative water source pose challenges in terms of the cost and time required to design, permit, and construct the needed

[18] https://doi.org/10.1002/awwa.1959

[19] See Appendix A which MWWA believes captures the typical timeline for brining treatment online under normal circumstances.

infrastructure, as well as potential incompatibility with that water[20]. It is important to recognize that there are many PWS in Massachusetts where interconnections or participation in regional supplies will just not be possible, and that is likely the case across the nation, but the option should exist to allow interconnections as a potential compliance avenue.

Communication:

In Massachusetts, MassDEP has required consumer notification in communities where the PFAS6 levels are above 20 ppt. The first verified result over 20 ppt requires a Public Education notice and exceedance of the MMCL requires a Tier II Public Notice. We believe the Tier II notification is the appropriate initial notice level. The added layer of Public Education in Massachusetts is problematic because a customer can receive a notice one month and then two months later, they receive a very similar notice in the formal Tier II Public Notice. EPA proposes that the system must repeat notice every three months if the violation or situation persists unless the primacy agency determines otherwise, but that at a minimum, systems must give repeat notice at least once per year. Because it will take time for a PWS to design and construct treatment, we do not find quarterly Public Notice to have added value and suggest instead that a Tier III notice is the more appropriate level if the violation persists.

We want to caution EPA that any required educational statements must have clear and appropriate messaging. MWWA believes EPA must revisit its proposed required Standard Health Language for Public Notice, as it is not well written, nor easily understood by the lay person. While by no means perfect, MassDEP's language is more easily understood than EPAs: "*Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers*."

In Massachusetts, the notices MassDEP requires suggest that consumers in sensitive populations use alternative sources of water, yet there is very little guidance given as to what alternatives are guaranteed to be "PFAS-free." The guidance on MassDEP's own website regarding Point of Use filters states *"Treatment systems and devices are not specifically designed to meet Massachusetts' drinking water standard for PFAS6. There are systems that have been designed to reduce the sum of PFOS and PFOA to below EPA's former Health Advisory of 70 ng/L. Any treatment device you use should be certified to meet the National Sanitation Foundation (NSF) standards to remove PFOS and PFOA compounds so that the sum of their concentrations is below 70 ng/L. Please be aware that 70 ng/L is significantly greater than the MassDEP's drinking water standard of 20 ng/L for the PFAS6 compounds. Many of these treatment devices certified to meet NSF standards will likely be able to reduce PFAS6 levels to well below 70 ng/L, but there are no federal or state testing requirements for these treatment devices. If you choose to install a treatment device, you should check to see if the manufacturer has independently verifiable PFAS6 monitoring results demonstrating that the device can reduce PFAS below 20 ng/L*." It is very confusing for the public to be

[20] See Appendix B which outlines challenges and considerations with interconnections.

instructed to seek alternative supplies, yet not be provided with definitive information on what those alternatives are. EPA should concurrently encourage NSF to begin a process to certify Point of Use filters for PFAS removal to the levels of the proposed MCL if EPA is going to suggest this approach as an alternative. The public deserves to have the information necessary to make informed decisions and not be at the mercy of the water filter dealers. Since EPA issued interim Health Advisories for PFOA and PFOS stating that there are health effects at levels thousands of times lower than current lab detection limits, suggesting alternative compounds the problem. No water source (PWS, private well, bottled water) or treatment technology can claim to achieve full protection from health impacts of PFOA and PFOS since laboratories cannot come close to detecting these contaminants anywhere near the purported Health Advisory level.

It is imperative that EPA immediately develop an appropriate communication strategy so that water suppliers are not left to individually figure out how to handle risk communication. Thus far, there have been many questions raised by residents at public forums in the communities in Massachusetts that are grappling with PFAS contamination, especially about potential impacts to health, with very few direct answers from MassDEP and the Massachusetts Department of Public Health available. EPA must be better prepared to answer questions and address mounting fears of residents, and to assist PWS which are often the first responders to questions from their customers. As stated before, MWWA believes that there needs to be more communication by EPA to consumers regarding the other routes of exposure. It is a disservice to the public if the EPA and the states focus on drinking water to the exclusion of other, perhaps more significant PFAS contributions to one's body burden (e.g., consumer products, food). EPA must consult with risk communication professionals to develop the messaging, as the materials EPA has made available thus far are not particularly helpful.

Liability Concerns:

Disposal concerns are currently centered around pending updates to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on regulating PFOA and PFOS as hazardous substances, which may impact the available media disposal methods such as landfilling. EPA's current proposal includes setting the default reportable quantity (RQ) at 1.0 pound in a 24-hour period for PFOA and PFOS, and any release at or above RQ must be reported. Granular activated carbon (GAC), anion exchange (AIX) and novel adsorbents concentrate PFAS on the media. Disposal considerations are currently most important for anion exchange or novel adsorbents since, currently, major GAC manufacturers offer reactivation services that indicate thermal destruction of PFAS, while no resin or novel adsorbent manufacturers offer regeneration services. With the ongoing CERCLA update efforts, once PFOA and PFOS are designated as hazardous substances, it will limit the disposal options and sites willing to accept spent media such as resin and novel adsorbents. The draft CERCLA proposal still needs to be finalized, and no industry exemptions have been included for water and wastewater systems. Even though GAC manufacturers provide reactivation, there is indication that regenerated GAC does not

fully remove PFAS; with this knowledge, there is a possibility that only virgin media would be permitted for use in PFAS removal systems, not regenerated GAC.

MWWA made comments on dockets EPA-HQ-OLEM-2019-0341 and EPA-HQ-OLEM-2022-0922-0001 dealing with regulating PFAS under CERCLA. EPA should not move forward with any proposed CERCLA designation until exemptions are granted to water utilities who are passive receivers of PFAS substances. We understand that EPA is separately considering a CERCLA "enforcement discretion policy" to clarify that EPA may choose not to take CERCLA enforcement actions against certain entities. However, we vigorously advocate the exemption for water utilities and publicly owned treatment works be explicitly provided in the regulation. Policies are subject to interpretation and change, whereas regulations have a specified public process. We are therefore requesting that in whatever CERCLA rulemaking EPA advances, EPA provide PWS with an exemption from liability, including CERCLA third-party liability, if any or all PFAS compounds are designated as hazardous substances under CERLCA. Doing so would keep CERCLA liability on the industries that created the pollution and/or utilized the substances in the first place.

There are challenges associated with disposal of spent media and treatment residuals, beyond just the increased costs if no exemptions are granted to water (and wastewater) utilities under CERCLA. Massachusetts drinking water and wastewater facilities face a biosolids management and disposal crisis as PFAS chemicals are causing land application bans and restrictions, and dwindling landfill space reduces disposal capacity. We need EPA to rapidly work toward finding **permanent destruction technologies** or we will continue to face the prospect of a never-ending cycle of moving PFAS around our environment.

Source Investigations:

In Massachusetts, MassDEP stated that when a PWS detected PFAS in the drinking water above the MMCL, MassDEP would initiate an investigation into the potential sources of contamination and the identification of potentially responsible parties. There have been so many detections in Massachusetts that MassDEP has not had the resources in its Bureau of Waste-Site Clean-up to perform timely follow up investigations. MassDEP has only initiated contamination investigations for 48 PWS thus far, and there have been 170 PWS detections. This delay has left PWS and their ratepayers funding investigations and remediation in the absence of a responsible party. Proper resources must be allocated to identify the source of contamination and hold that party responsible for the remediation costs.

Supply Chain/Procurement:

MWWA is also concerned that PWSs will face even greater procurement challenges when new national drinking water standards for PFAS are put in place. At times, carbon vessels have been delayed for months due to supply chain issues and increased demand. Different states also have different procurement laws that must be followed for design and construction services, which add time to the overall project implementation schedule. EPA should communicate with existing authorities, such as the Defense

Production Act, to compel quicker manufacturing of treatment components for PFAS if necessary. We also note that Build America/Buy America provisions under BIL add complexity to securing water treatment components and appurtenances. EPA should communicate with Congress to remove this added burden, or EPA should provide a waiver for PFAS treatment components.

Cost:

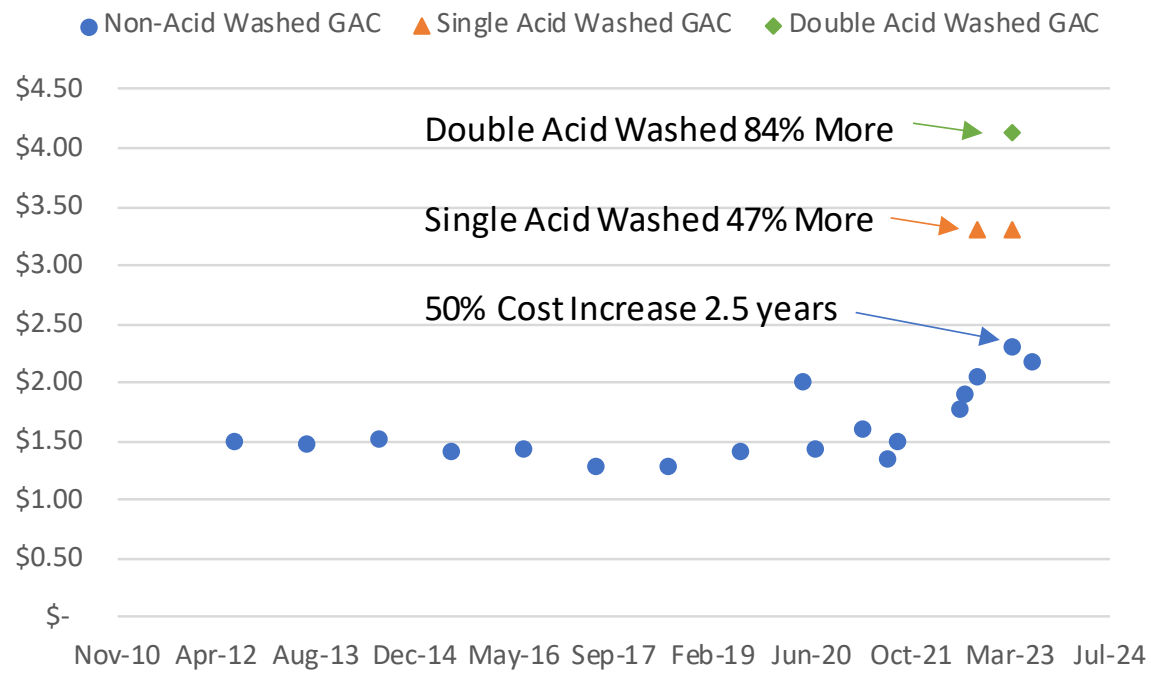
MWWA believes that EPA has grossly underestimated the costs associated with compliance with the proposed rule. We believe the technical memorandum[21] prepared by Black & Veatch on behalf of American Water Works Association (AWWA WITAF 56) is a more accurate depiction of the costs that will be incurred. For example, the most recent estimate by Black & Veatch suggests that the annualized costs of the rule could exceed $3.2 billion based on a PFOA and PFOS MCL of 4 ppt each. Massachusetts has already committed $209 million in State Revolving Fund (SRF) loans to fund just 24 PFAS treatment projects in the Commonwealth. Over the past year, SRF projects are routinely coming in 30% higher than what was originally committed, and we expect that trend will continue as we are experiencing inflationary pressure, supply chain challenges, and workforce shortages. With the limited public comment period, we do not have sufficient time to survey Massachusetts PWS to quantify private financing which many smaller, non-municipal PWS have had to utilize. MassDEP has also issued $11.8 million in targeted grant funding to assist PWS in their remediation activities. MassDEP recently issued the final Intended Use Plan for 2023 SRF funding and there are 29 communities on that list that have PFAS projects, and the projected 2023 funding is around $308 million. It's important to note that these PWS will still need local approval to enter into loan commitments for these projects to move forward. It is also important to note that several of these are multi-year projects with much higher price tags ($20 million+) which need to be funded over a multi-year period, as our SRF has a $15 million cap for funding given in any one year. As such, the loan commitments to date do not show the full extent of the needed expenditures for PFAS remediation. If all the 2023 projects move forward that will be more than $500 million expended in Massachusetts for just a fraction of systems who have exceeded the MMCL, which as we know is a much higher compliance value than EPA's proposal. It should also be recognized that SRF is primarily a financing mechanism that provides **loans** to PWS. Unless it is specified that all PFAS remediation projects are to be grant-funded, an SRF loan remains a burden on local ratepayers.

While private wells are not currently being regulated, homeowners may choose to remove PFAS from their private wells if they are aware of their presence. A point of entry treatment system currently costs approximately $6,000 in Massachusetts (this entails a sediment filter, water softener, and 2 carbon vessels). If the 311 private wells that had PFAS6 detections above 4 ppt were to install similar treatment that would amount to $1,866,000. The private well sampling that was conducted in Massachusetts represents a small percentage of these wells, so the magnitude of costs would

[21] WITAF 56 TECHNICAL MEMORANDUM, PFAS National Cost Model Report, B&V PROJECT NO. 409850 https://www.awwa.org/Portals/0/AWWA/Government/2023030756BVFinalTechnicalMemoradum.pdf?ver=2023-03-14-102450-257

undoubtedly be more significant if every private well was tested. These systems will also have ongoing maintenance costs with the schedule of media replacement, largely dependent on the water use in a particular home.

GAC media costs have been increasing steadily as illustrated in the following chart (GRAPHIC 4). We are concerned that costs will continue to rise for all PWSs who use GAC for treatment when there is a rush to provide it to systems for PFAS remediation across the nation.



GRAPHIC 4: Chart produced by MWWA Technical Advisory Committee plotting historical GAC costs.

A large PWS in Massachusetts, that uses GAC as part of their routine treatment process and not specifically for PFAS removal reported to MWWA that last fiscal year they used Carbon Activated (a GAC supplier) and replaced their media with virgin GAC at a cost of $194,450.00. This fiscal year, the bid for virgin GAC from Carbon Activated came in at $600,000.00, over triple the cost from last fiscal year. Due to this staggering increase, the PWS instead proceeded with regenerated GAC at a cost of $184,000.00 for their media replacement.

EPA states *"To help communities on the frontlines of PFAS contamination, the passage of the Infrastructure Investment and Jobs Act, also referred to as the Bipartisan Infrastructure Law (BIL), invests over $11.7 billion in the Drinking Water State Revolving Fund (SRF); $4 billion to the Drinking Water SRF for Emerging Contaminants; and $5 billion to Small, Underserved, and Disadvantaged Communities Grants. These funds will assist many disadvantaged communities, small systems, and others with the costs of installation of treatment when it might otherwise be cost-challenging."* While this funding is appreciated, it's not nearly enough for what PWS will need to address PFAS.

Additionally, the BIL funding has a sunset which will likely occur before many PWS are able to get through the monitoring and design process, preventing them from accessing these monies.

Kleinfelder's survey of New England PWS (51 respondents) regarding capital costs for treatment per million gallons per day treated averaged $3.8 million. The survey reported yearly O&M for media replacement from $250,000-$373,000.[22]

MWWA strongly encourages EPA to establish and maintain communications with Congress on how to provide more funding to communities facing PFAS contamination. There must be committed attention not only to the initial capital costs that PWS will incur to install treatment, but also ongoing O&M costs such as for sampling, operation and maintenance of the treatment system, and media replacement. In some situations, the responsible party may pay for the capital costs. In most cases, municipalities will need to front the costs and file lawsuits against potentially responsible party(ies) (if any) for reimbursement. It is likely that many contaminated water supplies may not have an easily identifiable source or responsible party. Who will be responsible for these ongoing costs? Ratepayers should not have to bear this burden for harm caused by others. The proposed MCL represents an unfunded federal mandate unlike any other in the past under the SDWA and costs associated with complying with the rule need to be fully funded in perpetuity by the federal government.

Closing:

Thank you for the opportunity to provide these comments. Public water suppliers understand the importance of ensuring that the drinking water that reaches their customers meets SDWA requirements and protects the public's health. Water suppliers work hard each day to meet these goals and satisfy their customers' expectations. As we have all come to be keenly aware, the issue of emerging contaminants is a monumental challenge. Our members will be tasked with meeting any and all regulatory requirements and standards; therefore, EPA has an obligation to address our implementation concerns prior to finalizing the rule. **EPA should also be using its authority to regulate the production of PFAS – it would be much more cost-effective to prevent PFAS from entering our environment and water supplies than it is going to be to clean up the contamination.** We look forward to working collaboratively with EPA and MassDEP to ensure our PWS are able to meet their mandate of continued protection of public health.

Sincerely,

Jennifer A. Pederson
Executive Director

[22] Presentation by Ben Powers, EIT, Kleinfelder, "PFAS Treatment in New England: A Regional Survey," April 2023, New England Water Works Association, Spring Conference

APPENDIX A - TREATMENT TIMELINE

MWWA TECHNICAL ADVISORY COMMITTEE WORK PRODUCT		
Activities and Timeline for PFAS Treatment	**Scenario: PFAS found in a source >MMCL. Treatment required.**	
This does not include identification of contamination source or responsible party.		**Total Duration: 27 to 44 months (2.25 to 3.67 years)**

	Task/Activity	Comments	Duration
1	**Phase 1: Study/Evaluation of Problem**	Identify the problem, identify alternatives, evaluate alternatives, make recommendations, prepare cost estimates.	2 to 4 months, depending on the availability of funding. Add 3 to 6 months if funding must be obtained at Town Meeting.
1a	Obtain Funding for Engineering Study	If borrowing required, requests for capital funds usually required Town Meeting vote, spring or special in the fall.	
1b	Prepare RFP for Engineering Study	Most municipalities required to solicit proposals for engineering work. Could save time if Study, pilot study, design, permitting, procurement, construction, and start-up are all included in initial RFP.	
1c	Select Engineer	If RFP is required.	
1d	Complete Alternatives Analysis:	If treatment is recommended, then proceed with pilot study. Recommendations should also include ball park cost estimates for future	
2	**Phase 2: Pilot Study**	Development of study scope, completion of study, documentation of study, DEP Review/Approval.	5 to 7 months depending on need for funding and RFP for engineering services.
2a	Obtain funding for Pilot Study	May require approval at Town Meeting.	
2b	RFP for Pilot Study	Most municipalities required to solicit proposals for engineering work.	
2c	DEP Pilot Study Proposal	Assuming only 1 season is required.	
2d	DEP Review/Approval of Pilot Study Proposal	Assuming only 1 season is required.	
2e	Conduct Pilot Study	Assuming only 1 season is required.	The pilot duration is 2 months – assuming RSSCT/bench-scale. Full-scale pilot could be many months longer.
2f	Submit Pilot Study Report	The study should include recommended engineering design parameters and capital cost estimate (for at least the next engineering phase).	
2g	DEP Review/Approval of Pilot Study Report	Pilot study report becomes the basis of design for any treatment systems.	

	Task/Activity	Comments	Duration
3	**Phase 3: Design and Permitting**	Need to incorporate time for Owner review of design concepts and features.	6 to 9 months for a smaller system, depending on scope. Longer for a larger system. Duration of design work depends on required treatment. Assumes funding required for Design services. Worst case scenario assumes a new building is required. Many unknowns associated with residuals
3a	Obtain funding for Design and Permitting	May require approval at Town Meeting.	
3b	RFP for Design/Permitting Engineer	Most municipalities required to solicit proposals for engineering work.	
3c	Select Engineer for Design/Permitting	If RFP is required.	
3e	Contract Negotiations/Sign Agreement, NTP		
3A	***A. Design***		
3A1	Phase 1: Conceptual Design	25% design phase.	
3A1a	Site Selection		
3A1b	Site Layout		
3A1c	Equipment Sizing		
3A1da	Process Diagrams		
3A1e	Owner Review of Plans		
3A2	Phase 2 : Design Development (50% Design)	Brings the design to 50%. All systems defined.	
3A2a	Site and Civil Plans		
3A2b	Process Mechanical Plans		
3A2c	Instrumentation (SCADA)		
3A2d	If New Building		
3A2e	Structural/Architectural		
3A2f	Electrical		
3A2g	HVAC		
3A2h	Plumbing		
3A2i	Security		
3A2j	Owner Review of Plans		
3A3	Phase 3 : Final Design (100% Design)	Design completion, all disciplines. Ready to bid/procure.	
3A3a	Project Plans		
3A3b	Project Specifications		
3A3c	Final Cost Estimate		
3B	***B. Permitting***	Required.	
3B1	DEP Review (Design Plans and Specs)	If site work near wetlands	
3B2	Local Notice of Intent	Depends on design scope.	
3B3	Local Planning Board (if required)	Depends on design scope.	
3B4	MEPA ENF/EIR (if required)	Depends on design scope.	
3B5	NESHP (if required)	Depends on design scope.	
3B6	NPDES (if required)	Depends on design scope.	
3B7	UIC (if required)	Depends on design scope.	

	Task/Activity	Comments	Duration
3C	**C. Funding for Construction**	If additional funds required for construction and borrowing is required then funding approval may require another Town Meeting if funds not already obtained or cost estimate exceeds initial funding amount.	
4	**Phase 4: Bidding (Procurement)**	Complexity of procurement depends on complexity of design and anticipated construction costs.	2 to 3 months, depending on the scope of the project. Add another month if filed sub-bids are required.
4a	Bid Advertisement		
4b	Solicit Bids (Plans and Specifications)		
4c	Open and Evaluate Bids		
4d	Notice of Award		
4e	Execute Contracts (bonds & insurance)		
4f	Additional Time if Filed Sub-Bids Required		
5	**Phase 5: Construction**	Complete construction and commissioning of the treatment facilities.	1 to 1.5 years, depending on the scope and complexity of the construction project. Additional time may be required based on winter conditions and equipment lead time.
5a	Project Submittals		
5b	Equipment Order/Delivery	Wildcard. Equipment/material lead time could be extended based on demand and availability of stock/materials/equipment.	
5c	Site Work	Add time if winter work required.	
5d	Building Envelope		
5e	Building Systems		
5f	Process/Mechanical	Duration depends on complexity	
5g	Equipment Installation		
5h	Start-Up and Testing		2 to 4 weeks
5i	Training O&M Manual		1 to 2 weeks
5j	Commissioning		1 to 2 weeks
5k	Record Drawings	After system placed into service.	

APPENDIX B - INTERCONNECTION PROCESS

Summary of Interconnection Process:

Activities, Regulatory Requirements, Timeframes, and Costs

As the move to regulate PFAS in drinking water in Massachusetts has commenced, a number of public water systems have needed to confront the issue due to PFAS detections from voluntary or past regulatory testing. One option for systems with detects at levels of concern is to utilize an alternate source of water obtained through interconnections with neighboring water systems. While this may be a viable and reasonable option, the use of interconnections as a short or long-term solution to PFAS contamination is not a simple alternative and is beset with issues and concerns.

How quickly an interconnection can be activated and used to replace a PFAS contaminated source is very dependent on site-specific issues. The table below summarizes some of the circumstances that are present and the impact on activation timelines. This summary is not all inclusive; there are numerous combinations of situations that influence the time it would take to activate an interconnection.

Situation	Activation Timeframe
Existing interconnection that is frequently used, has a current use agreement or understanding, does not require any regulatory approvals and has working infrastructure	Hours
Existing interconnection that is infrequently used, lacks a current agreement, does not require any regulatory approvals and has damaged or non-working infrastructure (valves, meters)	Days to weeks
Existing interconnection that is infrequently used, lacks a current agreement, requires regulatory approvals and has damaged or non-working infrastructure (valves, meters)	Weeks to months or even years
New interconnection with minor infrastructure upgrades (pipe, valves, vault, meter), regulatory approvals and agreement needed	6 months-2 years
New interconnection with major infrastructure upgrades (pipe, valves, pump station, storage tank, pressure reducer, vault, SCADA), multiple regulatory approvals, agreements	1-5 years

Factors that need to be considered in development of the interconnection option include:

- Getting Local Approvals
    - Both the supplying system and the receiving system need to agree to make the interconnection option viable. That process of agreement may involve town meeting, city council approval, votes of District commissioners or other formal authorization following a legally established procedure. Approvals by legislative bodies may only happen at certain times, thus subjecting the interconnection activation to schedules driven by other parties and/or statutes.
    - Prior to any formal votes or approval actions, the interconnection concept would have to be at least partially developed. That planning process would need to involve engineers from both sides along with directors, commissioners and upper management. The planning process along with preliminary design, authorization to proceed, budget approvals, regulatory guidance and creation/approval of an intermunicipal or inter-district water supply agreement could take 1-3 years (or more).
    - Historical relationships between the supplying system and the receiving system play a critical role in creation of a viable interconnection. It is not unusual for there to be “bad blood” between the two sides that stems from some perceived transgression which occurred decades earlier. Sometimes those ill feelings resurface and prevent an otherwise viable interconnection from being developed.

- Regulatory matters and state approvals
    - Prior to construction and activation of a new interconnection and in some cases use of an existing interconnection, a number of regulatory hurdles must be overcome. These include:
        - Drinking water approvals from MassDEP-the drinking water program would need to review and approve a new interconnection and may have some say in approving use of an existing interconnection.
        - Water Management Act-How an interconnection impacts an existing WMA permit needs to be well understood. This is especially the case for the supplying system as the added demand may impact permitted withdrawal volumes, potentially push a withdrawal above its baseline or even result in a permit exceedance. If mitigation becomes necessary the supplying system needs to understand who would be responsible for mitigation and include appropriate language in an interconnection

agreement. The supplying system also needs to know how much of its permitted (or registered) withdrawal remains after providing water to a PFAS impacted system and whether that remaining volume is sufficient to allow for growth within the supplying system

- Interbasin Transfer Act-The Interbasin Transfer Act may apply to a new or existing interconnection if the source water is in a different river basin than the receiving system or if the receiving system's wastewater is discharged to a river basin different than the supply system's source water. Interbasin Transfer Act approvals are through the Water Resources Commission and typically involve multiple meetings with IBTA staff to identify and resolve issues before a hearing with the WRC.
- Wetlands Protection Act-For interconnections requiring new infrastructure near wetlands and other water resources, a filing with the local Conservation Commission would be needed. This process typically includes a public hearing followed by issuance of an Order of Conditions. The entire process could take two months or more.
- MEPA Filing-If the interconnection trips certain thresholds, an Environmental Notification Form (ENF) would have to be filed. That could potentially be followed by preparation of an Environmental Impact Report (EIR). The ENF could take 3-6 months while the EIR could take 6 months to 2 years. Public meetings and site visits would also be part of this process.
- Procurement-Purchasing and installing materials and equipment needed for a viable interconnection will typically involve procurement under Massachusetts law. Most often equipment and services will need to be bid, usually after design and preparation of specifications by a consulting engineer. The procurement process adds time to the overall development of the interconnection and the process can be further delayed through litigation brought by parties who are dissatisfied with the bid outcome.

- Technical/engineering concerns
  - Water pressure at the interconnection will, in part, determine the need for pumping. If the receiving system needs to pump water into parts of its system the design, construction and operation of the system will be much more complex and costly.
  - Available flow rates, in addition to pressure, will drive complexity and costs for the receiving system. Distribution system design (pipe size, storage) is

generally driven by fire flows. While pressures at the interconnection may be adequate, existing pipe size and condition in both the supplying system and receiving system may be flow limiting. Extensive water main upgrades may be required in order to meet both water use needs and fire flows in the receiving system and prevent low pressures and system disruptions (Rusty water, main breaks) in the supplying system.

- The supplying system needs to determine whether it has the physical capacity to supply the volume requested by the receiving system. This is a matter of water source capacity (well pumping rates, surface water and treatment facility capacity) and transmission capabilities (pumping stations and storage) along with regulatory limits on available volumes (WMA).
- The physical interconnection needs to be considered in terms of pipe size, materials, valves, metering, meter vault, SCADA controls, chemical injection (disinfection, corrosion control), alarms and pumping stations. Having the space to construct the needed infrastructure is also critical. Land acquisition and/or easements may be necessary to actually build the interconnection.

- Water Quality concerns
  - Using an interconnection between two water systems is not as simple as opening a valve if impacts on water quality for the receiving system are not well understood.
    - Conflicting water chemistry-Treated water from the supplying system may not be compatible with the water in the receiving system. This could result is precipitation of iron or other elements that causes discoloration. Worse yet, corrosive water from the supplying system could cause lead and copper to leach from pipes, services and plumbing in the receiving system, as occurred in Flint, MI.
    - Poor water quality at periphery of supplying system-Interconnections are often located at the periphery of the supplying system where water age can increase the likelihood of water quality problems including bacterial growth, low disinfectant residuals, elevated iron, elevated disinfection byproducts, tastes and odors. Eliminating elevated PFAS in exchange for elevated THMs or HAAs or generally poor water quality would not be a desired outcome of an interconnection that may have already contributed to higher water rates.
    - Public perception-Customers in the receiving system may not be pleased to receive water with high dissolved solids, poor taste, high

chlorine levels and discoloration that comes through the interconnection. While the new supply may meet all water quality standards, it may not meet with satisfaction from the customers who use it. This is especially true if the receiving system had previously had soft, surface water and will now get hard, groundwater with high dissolved solids.

- Costs
    - There are many cost factors that need to be considered
        - There may be substantial buy in fees
        - Utilities may have to payer higher per unit charges than if they were utilizing their own supply
        - There may be emergency use surcharges