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August 5, 2021

Joseph Berman, Chair
Weston Conservation Commission
Weston Town Hall
11 Town House Road
Weston, MA 02493

Jane Fisher Carlson, Chair
Weston Zoning Board of Appeals
Weston Town Hall
11 Town House Road
Weston, MA 02493

RE: Weston 518 South Avenue Proposed Development

Dear Conservation Commission, Zoning Board of Appeals, and Planning Board Members,

I have been retained by Hill Law representing abutters to the project and write to express some additional concerns associated with the proposed wastewater discharge at 518 South Avenue in Weston, MA. In earlier submittals I have identified probable downstream water quality impacts associated with the proposed wastewater discharge caused by excessive nutrients (nitrogen and phosphorus) and resulting eutrophication of surface waters including potential cyanobacteria blooms in Nonesuch Pond.

As I reported in my earlier comment letters the design flow of the proposed wastewater discharge is 38,000 gallons per day. This is ten (10) times the flow of the adjacent stream where it will discharge. After infiltrating to the underlying groundwater within 100 feet of wetlands it will discharge into the adjacent stream on the property. That stream is reported to have a summer low flow of 3780 gallons per day.

As you may be aware, there is widespread concern about a group of emerging contaminants of concern (CEC) associated with wastewater. These contaminants are present in wastewater and can become problematic when concentrated in high density developments. Specifically, this letter addresses per- and polyfluoroalkyl substances (PFAS), so-called “forever” chemicals that are persistent in the environment and are believed to be human health threats in low concentrations. Massachusetts DEP (MassDEP) has established a drinking water standard of 20 parts per trillion (ppt) and is working towards the development of surface water standards for PFAS.

These contaminants are being detected in groundwater and surface waters throughout the Commonwealth and have resulted in the closure of several drinking water supplies. Sources are

believed to include many household goods such as non-stick pots and pans, clothing treatments, and cleaning products. When wastewater is concentrated into a single discharge from numerous dwellings, concentrations of these pollutants can exceed drinking water standards in downstream waters. In this case the proposed wastewater discharge is ten times the volume/flow of the adjacent stream.

My specific concerns regarding ecological impacts of PFAS are outlined below, including relevant scientific studies and findings.

PFAS Overview

According to the United States Environmental Protection Agency (USEPA), PFAS is a large class of man-made chemicals that includes PFOA (perfluorooctanoic acid), PFOS (perfluorooctane sulfonic acid), and GenX (a technology that is used to make high performance fluoropolymers without PFOA) chemicals. Since the 1940s, PFAS have been manufactured and used in a variety of industries in the United States and around the globe. PFAS are found in everyday household items such as food packaging and non-stick, stain repellent, and waterproof products like pots and pans. PFAS are also widely used in industrial applications and for firefighting. PFAS can enter the environment through production or waste streams and are very persistent in the environment and the human body. There is a growing body of toxicological evidence that some PFAS have adverse reproductive, developmental and immunological effects in animals and humans, including cancer.[1] Organisms residing in environments into which PFAS have been released may contact media containing PFAS and may bio-accumulate the compounds.[2]

Massachusetts PFAS Standards

In response to this growing body of evidence, in 2016, the USEPA established cumulative-lifetime health advisories for PFOA and PFOS at 70 parts per trillion (ppt) in drinking water.[3] In addition, on October 2, 2020, the Massachusetts Department of Environmental Protection (MassDEP), published its PFAS public drinking water standard, a Massachusetts maximum contamination level (MCL), of 20 ppt individually or for the sum of the concentrations of six specific PFAS.[4] These PFAS are perfluorooctane sulfonic acid (PFOS); perfluorooctanoic acid (PFOA); perfluorohexane sulfonic acid (PFHxS); perfluorononanoic acid (PFNA); perfluoroheptanoic acid (PFHpA); and perfluorodecanoic acid (PFDA). MassDEP abbreviates

[1] "Understanding PFAS in the Environment," PFOA, PFOS and Other PFAS, *United States Environmental Protection Agency,* updated December 21, 2018, https://www.epa.gov/sciencematters/understanding-pfas-environment.

[2] Michigan Department of Environmental Quality Water Resources Division, "Recommended PFAS Screening & Evaluation Procedure for Industrial Pretreatment Programs (IPPs)," April, 2018, https://www.michigan.gov/documents/deq/deq-tou-WRD-IPP_PFAS_Guidance-ScreeningEvaluation_620434_7.pdf.

[3] "Drinking Water Health Advisories for PFOA and PFOS," Groundwater and Drinking Water, *United States Environmental Protection Agency,* updated February 18, 2021, https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos.

[4] Note that most drinking water standards are in parts per million (ppm) or parts per billion (ppb). A concentration of one part per trillion means that there is one part of that substance for every one trillion parts of either air, water or soil in which it is contained. 1 part per trillion (ppt) is equal to 0.00001 part per million (ppm).

this set of six PFAS as "PFAS6." This drinking water standard is set to be protective against adverse health effects for all people consuming the water.[5]

In addition to drinking water exposure, MassDEP is beginning to investigate how to develop surface water standards in recognition of the impacts of PFAS on ecological habitats. [6] In preparation for standard setting, MassDEP conducted tests last fall with the U.S. Geological Survey of surface waters and found PFAS in each of the 27 rivers and brooks sampled for the substances within the Commonwealth. For the PFAS survey, water samples were drawn from 64 locations near wastewater treatment plants and industrial sites in close proximity to the rivers. Tests for two dozen PFAS compounds at 43 locations exceeded the state's 20 ppt standard for drinking water. At least 15 rivers had levels exceeding 50 ppt.[7]

As mentioned previously, because PFAS has been used for years in everyday household items such as pans and clothing, like other contaminants, PFAS often ends up in wastewater. There is a growing body of evidence that onsite wastewater treatment systems and on-site septic systems are likely the main source of PFAS in drinking and surface waters, including studies in Cape Cod[8] and New York.[9] A study of national drinking water PFAS concentrations found that found that the presence of wastewater treatment plants in an area could be predictive of the presence of PFOS and PFOA in drinking water.[10] The key to controlling pollutant concentrations in receiving waters is to evaluate the volume of the wastewater discharge into the receiving waters and dilute the pollutants to safe levels to ensure ecological and public health. Effectively treating these compounds requires expensive technologies that are not commonly applied in treating wastewater, such as the sequential filtration of water through activated carbon media.

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[5] "Per- and Polyfluoroalkyl Substances (PFAS)," Drinking Water Health and Safety, *Massachusetts Department of Environmental Protection,* accessed July 17, 2021, https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas.

[6] Christian Wade, "'Forever chemicals' found tests of state's rivers," *Eagle Tribune*, July 6, 2021, https://www.eagletribune.com/news/merrimack_valley/forever-chemicals-found-tests-of-states-rivers/article_6861d0c8-3071-519a-a59d-287d0be29c0d.html.

[7] "Concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in Selected Brooks and Rivers in Massachusetts, 2020," U.S. Geological Survey and Massachusetts Department of Environmental Protection, June 30, 2021, https://www.mass.gov/doc/pfas-in-massachusetts-rivers-presentation/download.

[8] Laurel A. Schaider, Janet M. Ackerman, Ruthann A. Rudel, "Septic systems as sources of organic wastewater compounds in domestic drinking water wells in a shallow sand and gravel aquifer," *Science of The Total Environment,* Volume 547, 2016, pp. 470-481, https://doi.org/10.1016/j.scitotenv.2015.12.081.

[9] Bikram Subedi, Neculai Codru, David M. Dziewulski, Lloyd R. Wilson, Jingchuan Xue, Sehun Yun, Ellen Brau-Howland, Christine Minihane, Kurunthachalam Kannan, "A pilot study on the assessment of trace organic contaminants including pharmaceuticals and personal care products from on-site wastewater treatment systems along Skaneateles Lake in New York State, USA." Water Research, Vol 72., pp 28-39, https://pubmed.ncbi.nlm.nih.gov/25466637/.

[10] Xindi C. Hu, David Q. Andrews, Andrew B. Lindstrom, Thomas A. Bruton, Laurel A. Schaider, Philippe Grandjean, Rainer Lohmann, Courtney C. Carignan, Arlene Blum, Simona A. Balan, Christopher P. Higgins, and Elsie M. Sunderland, "Detection of Poly- and Perfluoroalkyl Substances (PFASs) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants," Environmental Science & Technology Letters, 2016, pp. 344-350, https://pubs.acs.org/doi/10.1021/acs.estlett.6b00260.

On November 30, 2020, the USEPA issued new guidance advising wastewater treatment plant facilities to monitor for PFAS in recognition of the potential for wastewater treatment plant discharges to contribute to PFAS contamination in surface water bodies.[11] This monitoring will likely the first step in many as the agency moves forward with setting surface water quality standards for PFAS due to the pollution from wastewater treatment plant facilities.

Bogle Brook is adjacent to and downgradient of the proposed wastewater and stormwater infiltration systems and is a headwater stream. According to recent publications from MassDEP, headwater streams are critical to downstream ecosystems and water supplies. MassDEP's website states, "Massachusetts is the most populous state in New England, and 98% of our state's population is served by drinking water supply systems that rely on isolated waters, including ephemeral, intermittent, and headwater streams."[12] As I have indicated previously, the proposed project has not disclosed the wastewater treatment technology or its proposed effluent limitations. While wastewater treatment plants do remove some pollutants to a limited degree, they still result in pollutant loads that can only be assessed and evaluated in the context of the receiving waters carrying capacity. The headwater stream adjacent to the site is tributary to Nonesuch Pond where Rivers Camp Nonesuch is located, providing swimming, boating, and fishing to children in the community. This wetland system includes a small headwater stream that is highly vulnerable to relatively low pollutant loads. As stated above the stream's summer baseflow is estimated to be approximately 1/10th (10%) of the proposed wastewater discharge.

Surface Water Quality Criteria Development for PFAS

Minnesota is one of the first states that has undertaken the process of developing surface water quality criteria for PFAS as Minnesota has been monitoring for PFAS in fish since the early 2000s. Minnesota prioritized PFOS (perfluorooctane sulfonate) as the main PFAS of concern present in fish tissue because PFOS is highly bioaccumulative. In 2007, the Minnesota Pollution Control Agency (MPCA) released a pair of PFOS protective values for fish consumption, one for fish tissue and the second, a surface water value that supports meeting the fish tissue value. The value for fish tissue is a maximum 0.37 nanograms PFOS per gram (ng/g) in fish tissue. The value for water is a maximum 0.05 ng/L PFOS in water. This was not a statewide standard, but rather targeted site-specific water quality criteria for Lake Elmo and connected waterbodies, Bde Maka Ska and Pool 2 of the Mississippi River. Addressing fish means looking at bioaccumulation in the food chain, which is why the value for PFOS in fish tissue is more stringent than values to protect drinking water. Concentrations of PFOS can be more than 7000 times higher in fish tissue than the surrounding water, so where a waterbody is used for harvesting fish and as a source of drinking water, eating fish can be a larger source of exposure

[11] "Interim Strategy for Per- and Polyfluoroalkyl Substances in Federally Issued National Pollutant Discharge Elimination System Permits," PFOA, PFOS and Other PFAS, *United States Environmental Protection Agency,* updated November 30, 2020, https://www.epa.gov/pfas/interim-strategy-and-polyfluoroalkyl-substances-federally-issued-national-pollutant-discharge.

[12] "Mapping and Protecting Vulnerable Wetlands and Stormwater Management Project," Wetlands Protection, Massachusetts Department of Environmental Protection, accessed July 21, 2021, https://www.mass.gov/guides/mapping-and-protecting-vulnerable-wetlands-and-stormwater-management-planning-project#-headwater-streams-.

because the PFOS concentrates so highly in fish tissue. Minnesota continues to actively evaluate its water quality criteria as new information emerges about PFAS.[13]

In addition, the state of Michigan has adopted specific PFAS numeric standards for wastewater treatment plants discharging into waterbodies. Michigan has water quality standards for discharges to surface water for two PFAS, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). PFOS has led to fish consumption advisories for some Michigan rivers because it bioaccumulates so readily in fish. The applicable WQS for PFOS is 12 ppt for streams that are not used for drinking water and 11 ppt for those used as a drinking water source. The applicable WQS for PFOA is much higher at 12,000 ppt for surface waters that are not used for drinking water and 420 ppt for those used as a drinking water source.[14] Furthermore, in recognition of the impact wastewater treatment facilities have on PFAS contamination, the Michigan Department of Environmental Quality (MDEQ) developed recommendations for PFAS Screening and Evaluation Procedures for Industrial Pretreatment Programs.[15] The state has encouraged wastewater facilities to use these recommendations to start investigating sources of PFAS, specifically PFOS and PFOA. MDEQ continues to encourage reporting for PFAS levels as they continue to evaluate appropriate standard setting criteria for PFAS statewide.

While other states have not developed guidance yet for PFAS, they are moving forward with restrictions on biosolids, organic matter recycled from sewage that is often used for agriculture. For example, the Maine Department of Environmental Protection (DEP) established screening levels for three PFAS in biosolids.[16] A University of New Hampshire study utilized Maine's screening levels to look at PFAS from wastewater treatment facilities in New Hampshire and Vermont and found that of the 39 biosolids reviewed in the sludge waste, 29 had PFAS levels that exceeded screening levels set by the Maine DEP.[17] While state agencies across the county and in particular New England work towards regulating PFAS from wastewater treatment plants, it is clear that wastewater treatment plants do contribute significantly to PFAS contamination in surface water bodies in a pervasive and harmful manner.

Conclusions and Recommendations

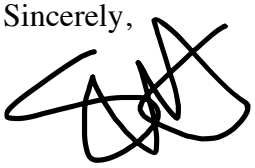
As clearly indicated, PFAS pose a significant risk to human and ecological health. At this time, as MassDEP has yet to determine surface water standards for the state, I urge the town to practice the "precautionary principle" and to not allow a wastewater discharge of this scale

[13] "Water-quality criteria development for PFAS," What is Minnesota doing about PFAS?, *Minnesota Pollution Control Agency,* accessed July 17, 2021, https://www.pca.state.mn.us/waste/water-quality-criteria-development-pfas.
[14] "Wastewater Treatment Plants/Industrial Pretreatment Program," PFAS Response, *Michigan Department of Environment, Great Lakes, and Energy: Michigan PFAS Action Response Team,* updated June 9, 2021, https://www.michigan.gov/pfasresponse/0,9038,7-365-88059_91299---,00.html.
[15] Michigan Department of Environmental Quality Water Resources Division, "Recommended PFAS Screening & Evaluation Procedure for Industrial Pretreatment Programs (IPPs)," April, 2018, https://www.michigan.gov/documents/deq/deq-tou-WRD-IPP_PFAS_Guidance-ScreeningEvaluation_620434_7.pdf.
[16] "Journey of PFAS in wastewater facilities highlights regulation challenges," Science Daily, May 26, 2021, https://www.sciencedaily.com/releases/2021/05/210526115551.htm.
[17] "Journey of PFAS in wastewater facilities highlights regulation challenges," Science Daily, May 26, 2021, https://www.sciencedaily.com/releases/2021/05/210526115551.htm.

within the watershed of a small headwater stream that directly flows through the town's potential drinking water aquifer and contributes to downstream recreational waters (including Nonesuch Pond). These impacts are clearly within the jurisdiction of the town in its administration of the MA Wetlands Protection Regulations that prohibit alterations to wetland resources areas.

Please contact me directly with any questions you may have.

Sincerely,



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