

**References in Support of Local Law No. 3 of 2023,  
A Local Law Regulating the Disposal of Sewage Sludge**

References in support of the legislative findings contained in Section III of proposed Local Law No. 3 of 2023, A Local Law Regulating the Disposal of Sewage Sludge are set forth below. The applicable finding is shown in italics.

- A. The Town Board of the Town of Thurston finds that the health and safety of the residents of the Town of Thurston is best served by restricting the operation of sewage sludge disposal facilities within the Town of Thurston.*

See references below.

- B. That sewage sludge frequently contains per- and polyfluoroalkyl substances – known as PFAS. PFAS are widely used, long lasting chemicals. The carbon-fluorine bond in PFAS is the strongest bond in chemistry which does not break down naturally in the environment.*

“Sewage Sludge ‘Fertilizer’ Contaminates Farms with Toxic PFAS,” Tracy Frisch, Wayne Miller, Abby Scher, Karl Palmquist, *Sierra Club Atlantic Chapter Website*, June 2023,

<https://atlantic2.sierraclub.org/sites/newyork.sierraclub.org/files/documents/2023/06/PFAS%20Paper%20Final%20June%201.pdf>

“Comments on NYS Draft Solid Waste Management Plan,” Dr. Murray McBride, June 28, 2023,

<https://waterfrontonline.files.wordpress.com/2023/08/murraymcbridecornellpfas.pdf>.

“PFAS Concentrations in Effluent, Influent, Solids, and Biosolids of Three Wastewater Treatment Plants,” Frances Bothfeld and Callie Mathieu, State of Washington Department of Ecology, Publication 22-03-028, November 2022,

<https://apps.ecology.wa.gov/publications/documents/2203028.pdf> .

“Addressing the Impacts of PFAS in Biosolids: An overview of regulations, treatment & challenges surrounding PFAS in biosolids,” *Wastewater Digest*, C.D.M. Smith, September 10, 2021, <https://www.wwdmag.com/sludge-and-biosolids/article/10940121/cdm-smith-addressing-the-impacts-of-pfas-in-biosolids> .

“Sludge in the Garden: Toxic PFAS in Home Fertilizers Made From Sewage Sludge,” Ecology Center and Sierra Club, *Sierra Club Website*, May 25, 2021,

<https://www.sierraclub.org/sites/default/files/PFA-Garden-Sludge-Report.pdf>

“Occurrence and Fate of Perfluorochemicals in Soil Following the Land Application of Municipal Biosolids,” Jennifer G. Sepulvado et al., *Environ. Sci. Technol.*, 2011, 45, 19, 8106–8112, March 29, 2011, <https://doi.org/10.1021/es103903d>

- C. *That when sewage sludge containing PFAS is spread on cropland, the plants grown on the land absorb PFAS from the soil and groundwater and people and animals consuming the crops absorb PFAS from the crops.*

‘Forever Chemicals’ persist through wastewater treatment, may enter crops,  
<https://www.psu.edu/news/research/story/forever-chemicals-persist-through-wastewater-treatment-may-enter-crops/>

“Spatiotemporal patterns of PFAS in water and crop tissue at a beneficial wastewater reuse site in central Pennsylvania,” Olivia Mroczko et al., *Journal of Environmental Quality*, Volume 51, Issue 6, November/December 2022, Pages 1282-1297,  
<https://access.onlinelibrary.wiley.com/doi/full/10.1002/jeq2.20408> .

“Accumulation of perfluorinated alkyl substances (PFAS) in agricultural plants: A review”, Rossella Ghisi, et al., *Environ Res.* 2019 Feb; 169: 326-341, February 2019,  
<https://pubmed.ncbi.nlm.nih.gov/30502744/>

- D. *That PFAS bioaccumulates up the food chain so that small amounts found in soil and water are concentrated in vegetation grown on the land or in the water, are more concentrated in the animals that eat the vegetation, and even more concentrated in animals that eat other animals or drink their milk.*

“PFOS Found in Most Seneca Lake Fish at Hundreds of Times NYS Limit for Same Chemical in Tap Water, Tests Showed,” Peter Mantius, *Water Front*, March 13, 2023,  
<https://waterfrontonline.blog/2023/03/13/pfos-found-in-most-seneca-lake-fish-at-hundreds-of-times-nys-limit-for-same-chemical-in-tap-water-tests-showed/> .

“PFAS Analyses of Fish Collected in 2020 from Seneca Lake,” DEC Division of Fish and Wildlife, Report number: ASU 22-38, February 14, 2023,  
<https://waterfrontonline.files.wordpress.com/2023/03/senecaanalysis.pdf> .

“Exposure pathways and bioaccumulation of per- and polyfluoroalkyl substances in freshwater aquatic ecosystems: Key considerations,” Asa J. Lewis, et al., *Science of the Total Environment*, Volume 822, 20 May 2022, 153561,  
<https://www.sciencedirect.com/science/article/abs/pii/S0048969722006532>

“Translocation, bioaccumulation, and distribution of perfluoroalkyl and polyfluoroalkyl substances (PFASs) in plants,” Bentuo Xu, et al, *iScience*. 2022 Apr 15; 25(4): 104061,  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8957016/> .

“Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China,” Meng Zhang, et al., *Environment International*, Volume 135, February 2020, 105347,  
<https://www.sciencedirect.com/science/article/pii/S0160412019315739> .

- E. *That scientific studies show that exposure to PFAS in the environment is linked to harmful health effects in humans and animals.*

“Special Issue: Understanding Environmental Risk from Exposure to Per- and Polyfluoroalkyl Substances (PFASs),” *Environmental Toxicology and Chemistry*,

Volume 40, Issue 3, March 2021,  
<https://setac.onlinelibrary.wiley.com/toc/15528618/2021/40/3> .

“Human and Ecological Health Effects of select PFAS,” PFAS Team, Interstate Technology and Regulatory Council, [https://pfas-1.itrcweb.org/7-human-and-ecological-health-effects-of-select-pfas/#7\\_1](https://pfas-1.itrcweb.org/7-human-and-ecological-health-effects-of-select-pfas/#7_1)

“Miniscule Amount of a PFAS May Weaken Immune Response, EPA Finds,” Pat Rizzuto, July 24, 2023, <https://news.bloomberglaw.com/environment-and-energy/minuscule-levels-of-a-pfas-may-weaken-immune-response-epa-finds> .

“Guide to Investigating PFAS Risk on Your Farm,” Rick Kersbergen, University of Maine Cooperative Extension, April 21, 2022,  
<https://extension.umaine.edu/agriculture/guide-to-investigating-pfas-risk-on-your-farm/> .

“PFAS Exposure and Risk of Cancer,” NIH National Cancer Institute, Division of Cancer Epidemiology website, <https://dceg.cancer.gov/research/what-we-study/pfas> .

“What are the health effects of PFAS?” US Center for Disease Control and Prevention Agency for Toxic Substances and Disease Registry, November 1, 2022,  
<https://www.atsdr.cdc.gov/pfas/health-effects/index.html> .

*F. That PFAS are recognized in New York as hazardous substances.*

6 NYCRR Part 597, Hazardous Substances Identification, Release Prohibition, and Release Reporting, amended to add perfluorooctanoic acid (PFOA-acid, Chemical Abstracts Service (CAS) No. 335-67-1), ammonium perfluorooctanoate (PFOA-salt, CAS No. 3825-26-1), perfluorooctane sulfonic acid (PFOS-acid, CAS No. 1763-23-1), and perfluorooctane sulfonate (PFOS-salt, CAS No. 2795-39-3) to the list of hazardous substances at 6 NYCRR Section 597.3, effective March 3, 2017,  
<https://www.dec.ny.gov/regulations/104968.html>.

*G. That the PFAS compounds found in sewage sludge come from the wastes entering the wastewater treatment plants (WWTPs) that produce the sludge. PFAS-laden wastes come from wastewater generated at industrial facilities that produce or process PFAS, from leachate from landfills that contain PFAS-laden wastes, from municipal wastewater with background levels of PFAS, from contaminated storm water, and from other sources.*

“Addressing the Impacts of PFAS in Biosolids: An overview of regulations, treatment & challenges surrounding PFAS in biosolids,” *Wastewater Digest*, C.D.M. Smith, September 10, 2021, <https://www.wwdmag.com/sludge-and-biosolids/article/10940121/cdm-smith-addressing-the-impacts-of-pfas-in-biosolids> .

*H. That the typical treatment methods at WWTPs do not remove or destroy PFAS, and that PFAS compounds settle in the sewage sludge.*

“Report: Removing PFAS from Minnesota wastewater would cost billions,” Catharine Richert and Kirsti Marohn, *MPRNews*, June 6, 2023,  
<https://www.mprnews.org/story/2023/06/06/report-removing-pfas-from-minnesota-wastewater-would-cost-billions> .

“Evaluation of Current Alternatives and Estimated Cost Curves for PFAS Removal and Destruction from Municipal Wastewater, Biosolids, Landfill Leachate, and Compost Contact Water,” prepared by Barr Engineering Co., Hazen and Sawyer for Minnesota Pollution Control Agency, May 2023, <https://www.pca.state.mn.us/sites/default/files/c-pfc1-26.pdf> .

- I. *That technology exists to remove PFAS from wastewater but to our knowledge no such technology is use in any WWTP in New York.*

“Maine plans removal of PFAS from sewage sludge used as fertilizer,” Tom Perkins, *The Guardian*, May 23, 2023, <https://www.theguardian.com/environment/2023/may/23/maine-pfas-removal-sewage-sludge>

“How to Destroy ‘Forever Chemicals’, Health-damaging PFASs are nearly impossible to break down—but a new hot-water technique can destroy them,” Lars Fischer, *Scientific American*, January 31, 2022, <https://www.scientificamerican.com/article/how-to-destroy-forever-chemicals/>

“Treatment Technologies,” PFAS Team, Interstate Technology and Regulatory Council, <https://pfas-1.itrcweb.org/12-treatment-technologies/>

- J. *That despite being widely understood to pose a serious health risk to people, wildlife and the environment, PFAS are not well regulated under New York and federal laws.*

See references below and:

“NYS Shrugs Off Threat of PFAS in Sewage Plant Effluent and Sludge as Farmers Force Michigan, Maine to Act,” Peter Mantius, *Water Front*, June 19, 2023, <https://waterfrontonline.blog/2023/06/19/nys-shrugs-off-threat-of-pfas-in-sewage-plant-effluent-and-sludge-as-farmers-force-michigan-maine-to-act/>

“Forever chemicals found in water coast to coast builds case for strict EPA limits,” Anthony Lacey, Sydney Evans, Environmental Working Group, July 18, 2023, <https://www.ewg.org/research/forever-chemicals-found-water-coast-coast-builds-case-strict-epa-limits> .

- K. *That on April 20, 2022, the State of Maine banned the land application of “sludge” and the “sale and distribution of compost and other agricultural products and materials containing sludge and septage” because of health concerns.*

Maine first in nation to ban PFAS in sludge, compost, Haley Rischar, *Waste Today*, May 3, 2022, <https://www.wastetodaymagazine.com/news/maine-legislature-bans-pfas-sludge-compost/>

- L. *That on June 15, 2022, the US Environmental Protection Agency (EPA) announced lifetime health advisory levels, measured in parts per trillion (ppt), to protect people from adverse health effects resulting from exposure throughout their lives to certain individual*

*PFAS in drinking water, including limits of 0.002 ppt and 0.004 ppt for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), respectively.*

Technical Fact Sheet: Drinking Water Health Advisories for Four PFAS (PFOA, PFOS, GenX chemicals, and PFBS), Office of Water, EPA 822-F-22-002, June 2022, <https://www.epa.gov/system/files/documents/2022-06/technical-factsheet-four-PFAS.pdf>

“Lifetime Drinking Water Health Advisories for Four Perfluoroalkyl Substances,” Environmental Protection Agency, *Federal Register*, June 21, 2022, <https://www.federalregister.gov/documents/2022/06/21/2022-13158/lifetime-drinking-water-health-advisories-for-four-perfluoroalkyl-substances> .

- M. *That on August 26, 2022, EPA issued a proposal to designate PFOA and PFOS and their salts and structural isomers as hazardous substances under CERCLA, or Superfund.*

Proposed Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances, September 6, 2022, Docket ID EPA-HQ-OLEM-2019-0341, <https://www.epa.gov/superfund/proposed-designation-perfluorooctanoic-acid-pfoa-and-perfluorooctanesulfonic-acid-pfos>

- N. *That on March 14, 2023, EPA proposed legally enforceable levels for six PFAS in drinking water with limits of 4 ppt for PFOA and PFOS.*

“Proposed PFAS National Primary Drinking Water Regulation,” EPA, March 14, 2023, <https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas> .

- O. *That on March 15, 2023, the New York Department of Environmental Conservation (DEC) released final ambient water quality guidance values for PFOA, PFOS, and 1,4-Dioxane of 6.7 ppt, 2.7 ppt and 0.35 ppt respectively.*

“DEC Releases Final Ambient Water Quality Guidance Values for PFOA, PFOS, and 1,4-Dioxane,” March 15, 2023, <https://www.dec.ny.gov/press/127293.html> .

- P. *That on March 28, 2023, the State of West Virginia enacted the “the PFAS Protection Act” requiring remedial action for raw water sources that send their wastewater to a treatment plant and that exceed EPA’s applicable health advisory for any of four listed PFAS (PFOA, PFOS, PFBS, or GenX).*

“West Virginia Passes the PFAS Protection Act,” *National Law Review*, May 1, 2023, <https://www.natlawreview.com/article/west-virginia-passes-pfas-protection-act> .

- Q. *That PFAS testing by Cyclopure, Inc. in March 2023 of water samples collected at 35 sites in the Town of Thurston and the adjoining towns of Cameron and Bath showed levels of PFAS greater than 1 ppt in eleven samples. The highest levels of PFAS were found in private drinking water wells located near long-standing sewage sludge land spreading operations. The four samples with the highest levels of PFAS showed total PFAS levels of 18.1, 14.9, 5.9 and 5.1 ppt. The highest levels of combined PFOA and PFOS in the tested samples were 9.6 and 7.8 ppt. These test results are significant*

*because the recommended lifetime exposures in the EPA health advisory of June 2022 are 0.002 ppt of PFOA and 0.004 ppt of PFOS.*

“Thurston Water Testing for PFAS,” Presentation to Thurston Town Board, Sierra Club Atlantic Chapter, April 19, 2023, p. 13, [https://img1.wsimg.com/blobby/go/4c611eac-8ffa-4708-af3b-dea66cb37775/downloads/2023-04-13\\_Thurston%20Water%20Results%20Report%20-%20Rel.pdf?ver=1691836733122](https://img1.wsimg.com/blobby/go/4c611eac-8ffa-4708-af3b-dea66cb37775/downloads/2023-04-13_Thurston%20Water%20Results%20Report%20-%20Rel.pdf?ver=1691836733122) , and addendum supplementing p. 13, August 12, 2023.

- R. *That levels of PFOA and PFOS just slightly above 9.6 and 7.8 ppt triggered remedial action by DEC to prevent potential exposure to contamination when PFOA and PFOS were detected in certain groundwater monitoring wells at levels above 10 ppt. At the Armonk Private Wells State Superfund site and WCG Labriola Landfill, an inactive landfill, DEC provided bottled water to properties where results were above 10 ppt and also offered installation of point-of-entry treatment systems.*

“Protecting Drinking Water in North Castle and Investigating Sources of PFOA and PFOS,” DEC, <https://www.dec.ny.gov/chemical/126339.html> .

- S. *That on April 13, 2023, EPA issued an Advance Notice of Proposed Rulemaking asking the public for input regarding potential future hazardous substance designations under CERCLA for (1) Seven additional PFAS, besides PFOA and PFOS, and their salts and structural isomers, or some subset thereof, (2) Precursors to PFOA, PFOS, and the seven additional PFAS listed; and (3) Categories of PFAS. This request for input follows EPA’s September 2022 proposed rule to designate PFOA and PFOS, and their salts and structural isomers as hazardous substances under CERCLA. This request for input follows EPA’s September 2022 proposed rule to designate PFOA and PFOS, and their salts and structural isomers as hazardous substances under CERCLA.*

“Addressing PFAS in the Environment, A Proposed Rule by the Environmental Protection Agency,” *Federal Register*, April 13, 2023, <https://www.federalregister.gov/documents/2023/04/13/2023-07535/addressing-pfas-in-the-environment> .

- T. *That on May 10, 2023, notwithstanding its recently adopted ambient water quality guidelines, DEC announced a draft Interim Strategy for the Control of PFAS Compounds in biosolids (i.e. sewage sludge) that requires DEC to require additional sampling if levels of PFOA and PFOS are above 20 parts per billion (ppb), and if levels of PFOA and PFOS are above 50 ppb requires DEC to prohibit “recycling” (meaning land application) until levels of PFOS or PFOA in the sludge are reduced to below 20 ppb. Levels in ppb are 1,000 times higher than levels in ppt.*

“DMM-DRAFT 7/ Biosolids Recycling in New York State – Interim Strategy for the Control of PFAS Compounds,” Dereth Glance, Deputy Commissioner, Office of Remediation and Materials Management, DEC, undated, [https://www.dec.ny.gov/docs/materials\\_minerals\\_pdf/dmmdraftpolicy7.pdf](https://www.dec.ny.gov/docs/materials_minerals_pdf/dmmdraftpolicy7.pdf) .

- U. *That EPA and DEC are not imposing enforceable PFAS limits consistent with scientific studies showing the harmful health impacts of exposure to PFAS or with the EPA health*

*advisories announced in June 2022, and that more stringent requirements are necessary to protect the residents of Thurston against damage to their health and safety from PFAS.*

See references above.

- V. That it is not feasible for the Town of Thurston to test incoming loads of sewage sludge for PFAS.*
  
- W. That the best way to avoid further substantial threats to the health and safety of the residents of Thurston from the adverse affects of-the disposal of PFAS-contaminated sewage sludge within the town is to prohibit the disposal of sewage sludge within the town.*

See references above.

- X. That agricultural activities can be conducted in the town successfully and profitably without polluting the town's land and water through the application of sewage sludge.*

Upon information and belief, most farmers in Thurston farm successfully and profitably without using sewage sludge.