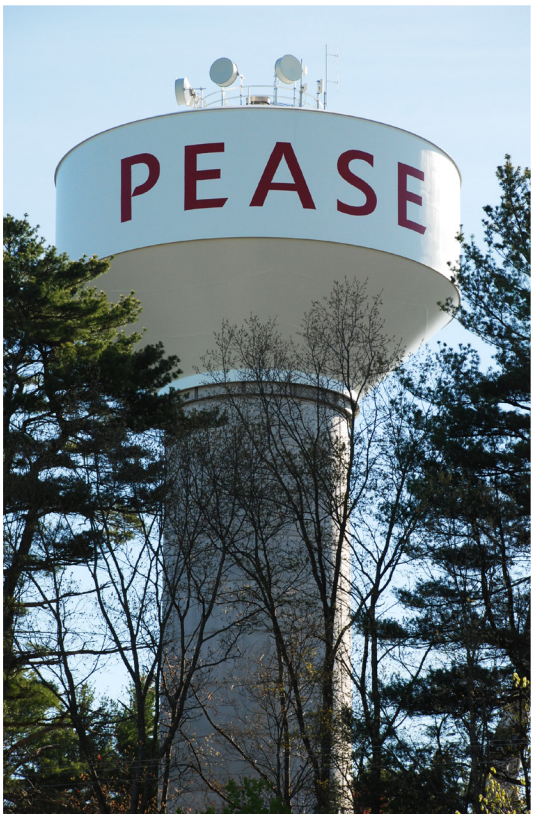
ANNUAL WATER QUALITY REPORT

Pease Water System

PWSID 1951020

Water Testing Performed in 2017



INTRODUCTION

City of Portsmouth

Department of Public Works

Water Division

We are pleased to present the 2018 Annual Water Quality Report. This report summarizes the results of drinking water testing performed from 01/01/2017 to 12/31/2017, and is provided to keep you informed about the quality of the water you rely on every day. It is being sent to every water customer served from the Pease water system (PWSID# 1951020). An extensive amount of information is provided in this report. Please contact us if you would like help understanding the information provided or have suggestions for future reports.

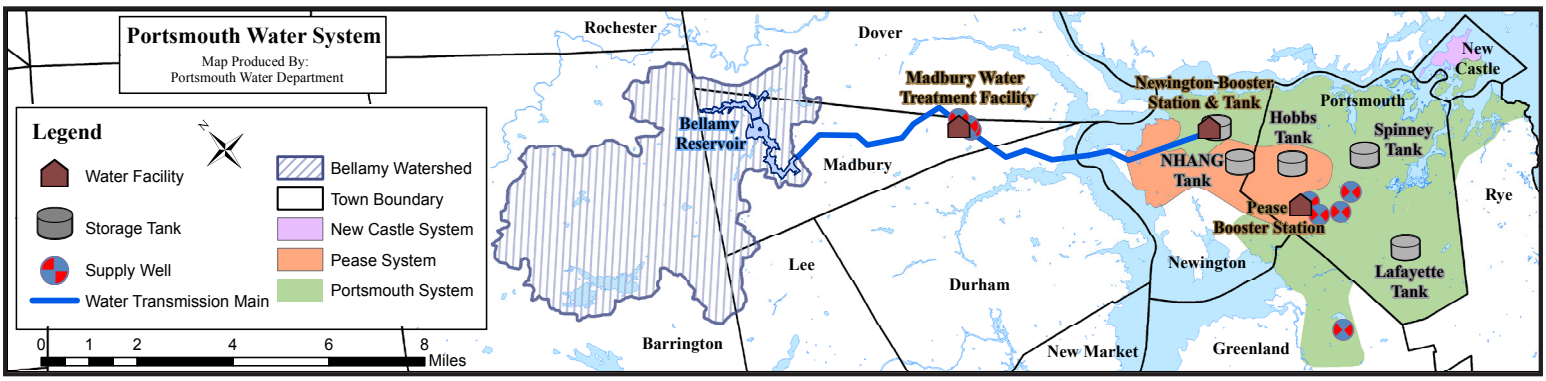
Our mission is to provide the community with dependable and safe drinking water that meets all current drinking water standards. The Portsmouth Water Division is constantly monitoring and routinely testing the drinking water according to federal and state requirements, to ensure the quality of water delivered to our customers consistently meets these water quality standards. Potential contaminants and impacts from changing weather cause new challenges. We remain vigilant in meeting the goals of water treatment, source water protection, water efficiency, system improvements, fire service capability and community education, while continuing to serve the needs of all our water users.

Where your water comes from

Water supplied to Pease Tradeport water system customers comes primarily from the groundwater wells located on the Tradeport (Harrison Well and Smith Well). Portsmouth water system (EPA PWSID# 1951010) supplies water to the Pease Tradeport water system as needed. 21.5 percent (%) of the water supplied to Pease Tradeport was from the Portsmouth water system in 2017.

Water from the Harrison Well and Smith Well is pumped to the Grafton Road Drinking Water Treatment Facility (WTF) where it is treated through two Granular Activated Carbon (GAC) filters, with Calgon FILTRASORB F-400 Carbon. These filters remove per- and polyfluoroalkyl substances (PFAS) that have been detected in the Harrison Well and Smith Well water. Sodium hypochlorite (bleach) for disinfection, fluoride as hydrofluorosilicic acid* (used to prevent tooth decay) and poly/ortho-phosphate (sequestering chemical to reduce precipitation of iron and manganese, and corrosion inhibitor used to protect distribution system pipes) are added before entering the distribution system.

Three groundwater wells supply most of the water from Portsmouth to the Pease Tradeport. Two of them, Portsmouth #1 Well and Collins Well, are located off Route 33 (Greenland Road). The third well, Greenland Well, is located off Post Road in Greenland. Sodium hypochlorite and poly/ortho-phosphate are added to the water supplied by the Portsmouth #1 Well, Collins Well, and Greenland Well. Fluoride as hydrofluorosilicic acid is also added at the Greenland Well. Occasionally water from the City's sources in Madbury contribute to the water pumping into Pease from the Portsmouth System. The Madbury sources are the Bellamy Reservoir and three wells. The water from the reservoir is treated using a coagulation, dissolved air floatation and dual-media filtration process. The treated water is chlorinated with sodium hypochlorite before distribution into the system. Sodium hydroxide (used to adjust the final pH and alkalinity), fluoride as hydrofluorosilicic acid (used to prevent tooth decay) and poly/ortho-phosphate (sequestering chemical to reduce precipitation of iron and manganese and corrosion inhibitor used to protect distribution system pipes) are also added prior to distribution.



SOURCE WATER

Source Protection

The Portsmouth Water Division routinely updates inventories of potential contaminant threats and is actively pursuing opportunities to increase the protection of our groundwater supplies and the Bellamy Reservoir through property and easement acquisitions.

New Hampshire Department of Environmental Services prepared drinking water source assessment reports for all public water systems between 2000 and 2003 in an effort to assess the vulnerability of each of the State's public water supply sources. Included in the report is a map of each source water protection area, a list of potential and known contamination sources, and a summary of available protection options. The results of the assessment, prepared in 2002 are noted in the adjacent table. Risk factors, such as proximity of highways and proximity of known contamination, are ranked and summarized in the table of Susceptibility Ratings in terms of the number of factors per risk category.

The complete Assessment Report is available for review at the DPW office. Please call for an appointment to view the report. It is also available online: https://www.des.nh.gov/organization/divisions/water/dwgb/dwspp/dwsap.htm

Substances that could be in water

In order to ensure that tap water is safe to drink, the EPA prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may contain small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects are available by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over land or through the ground, it dissolves naturally occurring minerals, and in some cases, radioactive material. It can pick up substances resulting from the presence of animals or human activity.

SOURCE WATER ASSESSMENT RESULTS

System	Source Information	Summary of Susceptibility Ratings		
		High	Medium	Low
Portsmouth	Greenland Well - GPW 003	4	3	5
	Portsmouth Well - GPW 004	5	4	3
	Collins Well - GPW 010	4	1	7
Pease	Smith Well - GPW 001	4	3	5

Contaminants that may be present in source water

- Microbial Contaminants, such as viruses and bacteria, which may come from wastewater treatment plants, septic systems, agricultural livestock operations, or wildlife;
- Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;
- Pesticides and Herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;
- Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and may also come from gas stations, urban stormwater runoff, and septic systems;
- Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.

WATER QUALITY MONITORING

Sustainability through the Capital Improvement Plan (CIP)

Many capital improvement projects that will increase the resiliency and quality of the water system are currently underway or have been completed. In 2016, a Granular Activated Carbon (GAC) filtration system was installed at the Pease Water Treatment Facility on Grafton Road to remove per- and polyfluoroalkyl substances from the drinking water. Upgrades to this facility are currently in design, and construction is tentatively scheduled to begin in 2019. The Water Treatment Facility (WTF) upgrade will include additional filters and improved systems to treat and monitor the water that supplies the Pease Tradeport. The City of Portsmouth has been actively engaged with the Air Force for their continued support of this project, and will continue to pursue further actions to ensure the Pease Tradeport water supply remains safe and sustainable. For the most up-to-date CIP information, please visit our web page at www.cityofportsmouth.com/planportsmouth/capital-improvement-plan

Important health information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons (e.g., persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants) may be especially at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 800-426-4791 or www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-hotline

Fluoridation

Your public water supply is fluoridated. According to the Centers for Disease Control and Prevention, if your child under the age of 6 months is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance of dental fluorosis. Consult your child's health care provider for more information. Dental fluorosis, in moderate or severe forms, may result in brown staining and/or pitting of the permanent teeth before they erupt from the gums. Concerns for dental fluorosis arise when fluoride levels are greater than 2 mg/L.

Water Quality Parameters

The following water quality parameters are routinely monitored to assess the general characteristics of the water supply. Note that the range of some of these parameters illustrates the differences between the characteristics of the surface water supply and the groundwater sources.

OTHER WATER QUALITY PARAMETERS

Parameters (Units)	Your Water Results		Secondary Drinking Water Standard SMCL
	Average Source Level	Results Range	
Chloride (ppm)	77	47 to 131	250
Copper (ppb)	15	<5 to 28	1000
Iron (ppb)	12	<50 to 390	300
Manganese (ppb)	13	<5 to 142	50
pH	NA	7.07 - 7.46	6.5 – 8.5
Sulfate (ppm)	17	14 to 29	250
Conductivity (umos/com)	551	433 to 670	NA
Alkalinity (ppm)	112	95 to 124	NA
Hardness (ppm as CaCO3)	125	72 to 160	NA
Ortho-Phosphate (ppm)	0.9	0.7 to 1.2	NA
Sodium (ppm)	49	38 to 150	NA

Community Education

Jesse Pearce, City's Water Quality & Resource Protection Specialist, speaking to students about where their water comes from and water quality.

WATER QUALITY MONITORING

Lead and Copper Results

The Water Division takes the responsibility of protecting your health very seriously. We want you to make informed decisions about your drinking water. Lead is not present in the water when it leaves our treatment and well facilities, or in the water mains that run below the streets. However, lead can be present in old service line connections that tie homes to the water system or plumbing inside homes and businesses. Due to the age of many homes in Portsmouth and surrounding towns, and the associated potential for leaded plumbing components, we encourage customers to have their water tested by a certified laboratory, especially if there are children under 6 or pregnant women in the household. We actively adjust the water chemistry at the treatment facility and well facilities according to our Corrosion Control Program, to reduce the potential for lead in households to dissolve into the water and end up at the tap. But if lead is present in your plumbing system, and is in contact with water, some risk remains. Information about our Corrosion Control Program can be found online at www.cityofportsmouth.com/publicworks/water

Lead was a common material used in plumbing until the 1980s. It is a powerful toxin that is harmful to human health. Pregnant women, infants and young children are especially vulnerable because even low levels of lead in the blood of children can result in behavior and learning problems, lower IQ and hyperactivity, slowed growth, hearing problems and anemia. Adults who drink water with lead concentrations over 15 parts per billion (ppb) over many years could develop kidney problems or high blood pressure.

Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 800-426-4791. Additional information is available from NHDES at 603-271-2516 or www.des.nh.gov/organization/divisions/water/dwgb/lead-copper

The City of Portsmouth samples for lead and copper at the Pease Tradeport from 10 homes and businesses every three years. The 2016 lead and copper testing resulted in all of the sites having less than the EPA Action Limit, and only 2 of the sites with levels above the limit of the laboratory testing method. For more information on this topic, please visit the City's website.

LEAD AND COPPER RESULTS

Contaminant	Your Water Results		Regulatory Requirements		Month & Year of Testing	# of Sites Exceeding Action Level / Total # of Sites	Violation	Common Source of Contaminant
(Units)	90th Percentile Sample Value	Range of Detected Values	Action Level	MCLG			(Yes/No)	
Lead (ppb)	1	<1 to 2.8	15	0	December 2016	0/10	NO	Corrosion of household plumbing systems, erosion of natural deposits
Copper (ppb)	0.489	0.052 to 0.717	1.3	1.3		0/10	NO	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

WATER QUALITY MONITORING RESULTS

Regulated Contaminants Detected

During the past year, we have taken hundreds of water samples in order to monitor and test for the presence of radioactive, biological, inorganic, volatile organic and synthetic organic contaminants. The tables below show **only** those contaminants that were detected in the water. Many more parameters were tested for, but not detected. They are not included in this report. The state requires us to monitor for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year when the sample was taken.

RADIOACTIVE CONTAMINANTS

Contaminant	Your Water Results		Regulatory Requirements		Violation	Likely Source of Contamination
(Units) (Year Sampled)	Level Measured	Results Range	MCL	MCLG	(Yes/No)	
Compliance Gross Alpha (pCi/L) (2013 & 2016)	Highest Level Measured: 1	<1 to 1	15	0	NO	Erosion of natural deposits
Uranium (ug/L) (2013 & 2016)	Highest Level Measured: 1	<1 to 1	30	0	NO	Erosion of natural deposits
Combined Radium 226 + 228(pCi/L) (2016)	Highest Level Measured: 1.96	<1 to 1.96	5	0	NO	Erosion of natural deposits

INORGANIC CONTAMINANTS

Contaminant	Your Water Results		Regulatory Requirements		Violation	Likely Source of Contamination
(Units)	Level Measured	Results Range	MCL	MCLG	(Yes/No)	
Barium (ppb) 2016 data	Highest Level Measured: 12.8 Average Source Level: 9.8	7.6 to 12.8	2000	2000	NO	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Chlorine (ppm)	Highest Level Measured: 2.49 Average System Level: 1.07	0 to 2.49	MRDL = 4	MRDLG=4	NO	Water additive used to control microbes.
Chromium (total) (ppb) 2016 & 2017 data	Highest Level Measured: <5 Average Source Level: <5	<5	100	100	NO	Discharge from steel and pulp mills; erosion of natural deposits.
Fluoride (ppm)	Highest Level Measured: 1.67 Average Level: 0.59	0 to 1.67	4	4	NO	Erosion of natural deposits; water additive, which promotes strong teeth; discharge from fertilizer and aluminum factories.
Nitrate (as Nitrogen)(ppm)	Highest Level Measured: 1.8 Average Source Level: 1.5	1.3 to 1.8	10	10	NO	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits.

DISINFECTION BYPRODUCTS

Contaminant	Your Water Results		Regulatory Requirements		Violation	Likely Source of Contamination
(Units)	Level Measured	Results Range	MCL	MCLG	(Yes/No)	
Haloacetic Acids (HAA) (ppb)	Highest Measured: 2.7	<1.0 to 2.7	60	NA	NO	By-product of drinking water disinfection
Total Trihalomethanes (TTHM) (Bromodichloro-methane, Bromoform, Dibromomethane, Chloroform) (ppb)	Highest Measured: 2.8	2.3 to 2.8	80	NA	NO	By-product of drinking water chlorination

Unregulated Contaminants Detected

Portsmouth participated in the 3rd stage of the EPA's Unregulated Contaminant Monitoring Rule (UCMR3) program in 2014 and 2015. The City performed additional tests on our drinking water. UCMR3 benefits the environment and public health by providing the EPA with data on the occurrence of contaminants suspected to be in drinking water. This helps the EPA determine if it needs to introduce new regulatory standards to improve drinking water quality. Contact us for more information. In 2018, the City is scheduled to participate in the 4th UCMR monitoring event. Data table on unregulated substances shown on page 7.

WATER QUALITY MONITORING RESULTS

UNREGULATED SUBSTANCES

Substance (unit of measure)	Year Collected	Average Detected	Range		Typical Source
			Low	High	
Chlorate (ppb)	2016	57.5	31.4	83.6	Agricultural defoliant or desiccant; disinfection byproduct; and used in production of chlorine dioxide.
Chromium-6 (hexavalent chromium) (ppb)	2016	0.31	0.16	0.46	Naturally occurring element; used in making steel and other alloys; chromium-3 or -6 forms are used for chrome plating, dyes and pigments, leather tanning, and wood preservation.
Molybdenum (ppb)	2016	<1.5	ND	1.5	Naturally occurring element found in ores and present in plants, animals and bacteria; commonly used form molybdenum trioxide used as a chemical reagent.
Perchlorate (ppb)	2016	0.12	0.11	0.12	Oxygen additive in solid fuel propellant for rockets, missiles, and fireworks. States have implemented standards and guidance at levels between 1 ppb and 18 ppb.
Strontium (ppb)	2016	200	159	240	Naturally occurring element; Historically used commercially in the faceplate glass of cathode-ray tube televisions to block X-ray emissions.
Per- and Polyfluoroalkyl Substances (PFAS)	2017	See PFAS Table in this report for summary of results from 2017			Surfactant or emulsifier; used in fire-fighting foam, circuit board etching acids, alkaline cleaners, floor polish, and as a pesticide active ingredient for insect bait traps; U.S. manufacture of PFOS phased out in 2002; however, PFOS still generated incidentally. Perfluorinated aliphatic carboxylic acid (PFOA); used for its emulsifier and surfactant properties in or as fluoropolymers (such as Teflon), fire-fighting foams, cleaners, cosmetics, greases and lubricants, paints, polishes, adhesives and photographic films.
Samples collected from Harrison Well and Smith Well					

Per- and Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are currently unregulated by the Safe Drinking Water Act. However, the EPA Health Advisory concentration and the NH Ambient Groundwater Quality Standard is 70 parts per trillion (ppt) for perfluorooctane-sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). In response to the discovery of PFOS in the Haven Well in May 2014 at levels that exceeded the EPA Provisional Health Advisory (200 ppt at that time), the Haven Well was removed from service. This well has remained disconnected from the Pease Tradeport water system since this finding. The source of the PFAS at the Tradeport was aqueous film-forming foam that had been used to extinguish fires and in training exercises at the former Air Force Base.

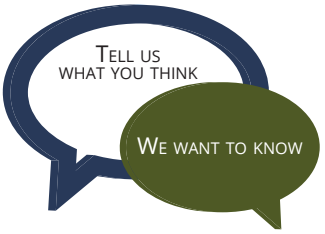
Over the past four years, the Harrison Well and Smith Well on the Pease Tradeport water system, and Portsmouth #1 Well and Collins Well in the Portsmouth water system, have been routinely monitored for per- and polyfluoroalkyl substances (PFAS) by the Air Force. The City of Portsmouth samples all of the other Portsmouth water supply sources twice per year. Sample results from 2017 are summarized in the PFAS table in this report. All monitoring data is available online: www.cityofportsmouth.com/publicworks/water

In September 2016, the City of Portsmouth installed a Granular Activated Carbon (GAC) filtration system to treat the water from the Harrison Well and Smith Well. Testing of this system has demonstrated effective removal of PFAS. The City of Portsmouth has contracted with an engineering firm to design a treatment system that will be capable of treating water from the Haven Well, Smith Well and Harrison Well. This design work is being conducted under an agreement with the Air Force for the upgrade of the Pease Water Treatment Facility on Grafton Road. Additional information and routine updates on the progress of this project are on the City's website.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

		PORTSMOUTH WATER Supplied to Pease System			PEASE TRADEPORT Treated Well Water***
PER- and POLYFLUOROALKYL SUBSTANCE (concentrations* reported in **ng/L** or **ppt**)		PORTSMOUTH #1 WELL	COLLINS WELL	GREENLAND WELL	SUPPLIED AFTER GAC TREATMENT
# of samples in 2017:		11	11	2	22
% of water supplied in 2017:		6.3%	4.7%	10.5%	78.5%
Perfluorobutane-sulfonic acid (PFBS)	Average	BD	**13**	BD	ND
	Range	ND to 8	8 to 20	ND to 6	ND
Perfluorobutanoic acid (PFBA)	Average	ND	ND	ND	BD
	Range	ND	ND	ND	ND to 10
Perfluorohexane-sulfonic acid (PFHxS)	Average	**7**	BD	**4**	ND
	Range	ND to 11	ND to 8	ND to 6	ND
Perfluorohexanoic acid (PFHxA)	Average	BD	BD	BD	ND
	Range	ND to 12	ND to 9	ND to 3	ND
**Perfluorooctane-sulfonic acid (PFOS)	Average	**3**	**3**	**4**	ND
	Range	ND to 8	ND to 7	4 TO 5	ND
**Perfluorooctanoic acid (PFOA)	Average	**6**	ND	ND	ND
	Range	ND to 10	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	Average	**4**	BD	ND	ND
	Range	ND to 8	ND to 7	ND	ND
** PFOS + PFOA	Average	**9**	**3**	**4**	ND
	Range	ND to 14	ND to 7	4 TO 5	ND

City of Portsmouth
Department of Public Works
Water Division
680 Peverly Hill Rd
Portsmouth, NH 03801



Community Participation

Please share your thoughts with us about the information in this report. We welcome your input and the opportunity to answer any questions you may have about the water supply. For more information about your drinking water, please contact Albert Pratt or Brian Goetz.

- Albert Pratt P.E., Water Supply Operations Manager, 603-520-0622
- Brian Goetz, Deputy Director of Public Works, 603-766-1420

Information is also online at: www.cityofportsmouth.com/publicworks/water

You are also invited to attend a regularly scheduled Portsmouth City Council meeting. Meetings are typically held twice each month on Monday evenings at Portsmouth City Hall. Information about meetings can be found online at: www.cityofportsmouth.com

REPORT ABBREVIATIONS

- **AGQS** (Ambient Groundwater Quality Standard): Groundwater quality standard established by the State of New Hampshire per Env-Or 600.
- **AL** (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
- **MCL** (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **MCLG** (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **MRDL** (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **MRDLG** (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **NA**: Not applicable.
- **ND**: (Not detected): Indicates that the substance was not found by laboratory analysis.
- **ppm** (parts per million): One part substance per million parts water (or milligrams per liter).
- **ppb** (parts per billion): One part substance per billion parts water (or micrograms per liter).
- **ppt** (parts per trillion): One part substance per trillion parts water (or nanograms per liter).
- **NTU** (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.
- **TT** (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.
- **LRAA** (Locational Running Annual Average): The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters. Amount Detected values for TTHMs and HAAs are reported as LRAAs.

PFAS Table Notes

- ***Due to laboratory analytical method limitations, low concentrations reported for these chemicals are considered estimates unless the amount measured is above 20 ng/L (ppt).
- ****EPA Health Advisory Level and NHDES AGQS for PFOS and PFOA concentration separately or combined is **70 ng/L** (ppt).
- ***** Concentrations after treatment through granular activated carbon (GAC).
- **Averages** are calculated using half of the method detection limit for samples that were less than detection, per EPA risk assessment protocols.
- **ND** = Not Detected above laboratory method detection limit.
- **BD** = Average calculated using half of detection limits for non-detect values resulted in average below the detection limit.
- **PFAS analyzed but not detected in the samples:** 6:2 Fluorotelomer sulfonate (6:2 FTS), 8:2 Fluorotelomer sulfonate (8:2 FTS), N-Ethyl perfluorooctane sulfonamide (EtFOSA), N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE), N-Methyl Perfluorooctane Sulfonamide (MEFOSA), N-Methyl Perfluorooctane Sulfonamidoethanol (MEFOSE), Perfluorodecane sulfonate (PFDS), Perfluorodecanoic acid (PFDA), Perfluorododecanoic acid (PFDoA),Perfluoroheptane sulfonate (PFHpS), Perfluoroheptanoic acid (PFHpA), Perfluorononanoic acid (PFNA), Perfluorooctane sulfonamide (PFOSA), Perfluorotetradecanoic acid (PFTeDA), Perfluorotridecanoic acid (PFTrDA), and Perfluoroundecanoic acid (PFUnA).