Water Quality ANNUAL REPORT

To Our Customers,

I am pleased to provide you with this annual Water Quality Report issued with the intent of ensuring that all customers are provided with an opportunity to review the quality of Concord's public water system.

Thank you for your continued support as we navigate evolving regulatory requirements. New, lower federal limits on forever chemicals (PFAS) along with the identification and removal of lead water service lines have been keeping us busy.

Concord Water is reviewing the final draft of the Long-Term Water Supply Study which looks at the different ways Concord can reliably provide water to our customers. The report evaluates the alternatives both from a financial and resiliency perspective. The bottom line is that water rates need to increase to upgrade the treatment of our water supplies to meet the new, more stringent regulations. Whether we elect to treat our sources locally, move towards a regional water supply solution, or a hybrid of both, the 50-year investment is relatively the same.

This need for investment in enhanced treatment for PFAS is not limited to Concord, but is affecting water suppliers across the nation.

As always, if you have any questions about any of the information provided, please feel free to call our office at 978-318-3250.

Respectfully,

Jeffrey A. Murawski

Concord Public Works, Water & Sewer Division, Superintendent

2023 HIGHLIGHTS

- **Replaced approx. 4,000 feet of water main in the Butternut Circle/Minot Road neighborhood.**
- **Received a $168,850 grant to catalog water service material throughout our system that will lead to the development of a Lead Service Line Replacement Plan.**
- **Replaced six lead water services.**
- **Responded to nine emergency water main breaks and repaired them quickly with minimal down time.**
- **Rehabilitated the Deaconess Satellite and Robinson Wells to increase flow and improve water quality.**

Water Quality Summary (JAN.–DEC. 2023)

To ensure that tap water is safe to drink, the EPA enforces regulations that require stringent monitoring of specific contaminants within public water supply systems. Within Concord's system, over 500 tests are run each year to assess approximately 145 potential contaminants, like bacteria, perchlorate, pesticides, metals, etc. Substances detected in Concord's drinking water in 2023 are listed in the summary table below. The town monitors some contaminants less than once per year because the concentrations for those contaminants are not expected to vary significantly from year to year and Concord has received a monitoring waiver from MassDEP. As a result, some of our data is more than a year old. For those contaminants, the date of the last sample is shown in the table below. The presence of these substances does not indicate that the water poses a health risk. These substances are divided into five categories: Microbiological, Primary, Secondary, Lead & Copper and Per- and polyfluoroalkyl Substances (PFAS). The Primary parameters list includes contaminants and associated limits of these contaminants that can adversely affect public health and are known or are anticipated to occur in public water systems. Secondary parameters are set for aesthetic purposes and are designed to assist the EPA in determining their occurrence in drinking water and whether future regulation is warranted. We are proud to report that Concord's water quality testing program not only consistently meets EPA's requirements for drinking water but goes above and beyond requirements to satisfy the higher standards that the town has set for itself. Additional water quality information is available on our website at *www.concordma.gov/water.*

MICROBIOLOGICAL PARAMETERS

Substance	Units	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Violation	Major Sources in Drinking Water
Giardia lamblia	oocyst/10L	2	ND-2	TT	0	No	Discharged especially where water is contaminated with sewage or animal wastes
Heterotrophic Plate Count (HPC) (2020)	CFU/mL	10	ND-10	TT	No Standard	No	Heterotrophic plate count is an indicator method that measures a range of naturally-occurring bacteria in the environment

PRIMARY PARAMETERS

Substance	Units	Highest Level Detected	Range of Levels Found	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Violation	Major Sources in Drinking Water
Barium	ppb	46	20-46	2000	2000	No	Erosion of natural deposits
Bromate (2022)[1]	ppb	11	10-13	10	0	Yes	By-product of drinking water disinfection
Chlorine[1]	ppm	0.4	0.02-0.80	4 (MRDL)	4 (MRDLG)	No	Water treatment for disinfection
Fluoride[2]	ppm	1.1	0.0-1.1	4	4	No	Water additive which promotes strong teeth
Haloacetic Acids[1]	ppb	21	2.2-11	60	No Standard	No	By-product of drinking water disinfection
Nitrate	ppm	2	0.4-2.0	10	10	No	Runoff from fertilizer use; Leaching from septic tanks; Erosion of natural deposits
Perchlorate	ppb	0.15	0.07-0.15	2	No Standard	No	By-product of drinking water disinfection; Found in propellants/fireworks/munitions/blasting agents/etc
Trihalomethanes[1]	ppb	36	10.1-36	80	No Standard	No	By-product of drinking water disinfection
Turbidity (2022)[3]	NTU	0.9	0.4-0.9	5	1	No	Suspended and colloidal particles including clay, silt, inorganic matter, algae, and microorganisms.

SECONDARY PARAMETERS AND *UNREGULATED CONTAMINANTS (CASRN)*

Substance	Units	Average Level Detected	Range of Levels Found	SMCL (ORSG Goal)	Major Sources in Drinking Water
Calcium	ppm	26	16.0-39.9	No Standard	Erosion of natural deposits
Chloride	ppm	105.6	65.4-214	250	Naturally present in the environment
Copper	ppm	0.02	ND-0.05	1	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
Hardness	ppm	91	52-144	No Standard	Erosion of natural deposits
Iron	ppb	57	ND-130	300	Erosion of natural deposits
Magnesium	ppm	6.6	3.5-10.7	No Standard	Erosion of natural deposits
Manganese	ppb	18	ND-58	50 (300)	Erosion of natural deposits
Methyl Tertiary-Butyl Ether or MTBE (1634044)	ppb	1.2	ND-3.9	(70)	Fuel additive; leaks and spills from gasoline storage tanks
Nickel (7440020)	ppb	2.1	ND-4.8	(100)	Erosion of natural deposits
Odor	T.O.N	1	ND-2	3	Naturally occurring organic materials that form ions when in water;
Perfluorobutanesulfonic Acid - PFBS (375-73-5)	ppt	5.5	ND-8.6	No Standard	See footnote 5.
Perfluorohexanoic Acid - PFHxA (307-24-4)	ppt	3.6	1-4.6	No Standard	See footnote 5.
pH	–	7.4	7.2-7.8	6.5-8.5	Corrosion of household plumbing systems/ erosion of natural deposits.
Potassium	ppm	38	30-45	No Standard	Naturally present in the environment
Sodium (7440235)	ppm	52	32-110	(20)	By-product of drinking water treatment; Naturally present in the environment
Sulfate	ppm	24	14-36	250	Naturally present in the environment
Total Dissolved Solids	ppm	388	223-560	500	Naturally present in the environment
Trichlorofluoromethane (Freon 11) (75694)	ppb	0.55	ND - 0.55	No Standard	Discharge from use as a refrigerant
Zinc	ppm	0.05	0.01-0.07	5	Naturally present in the environment

LEAD & COPPER PARAMETERS[4]

Substance	Units	90th Percentile Level Detected	90th Percentile Action Level (AL) (EPA's MCL)	# samples (# exceeding AL)	Ideal Goal (EPA's MCLG)	Exceeds Action Level	Major Sources in Drinking Water
Lead (2023)	ppb	5.1	15	31 (0)	0	No	Corrosion of household plumbing systems; Erosion of natural deposits; see statement below
Copper (2023)	ppm	0.45	1.3	31 (0)	1.3	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservative; see statement below

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)[5]

Regulated Contaminant	Units	Detect Results or Range	Highest Quarterly Average	MCL	Violation	Major Sources in Drinking Water
PFAS6	ppt	ND - 9.35	9.35	20	No	Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of moisture and oil resistant coatings on fabrics and other materials. Additional sources include the use and disposal of products containing these PFAS, such as fire-fighting foams.

Please see page 3 for an explanation of terms, abbreviations, and footnotes.

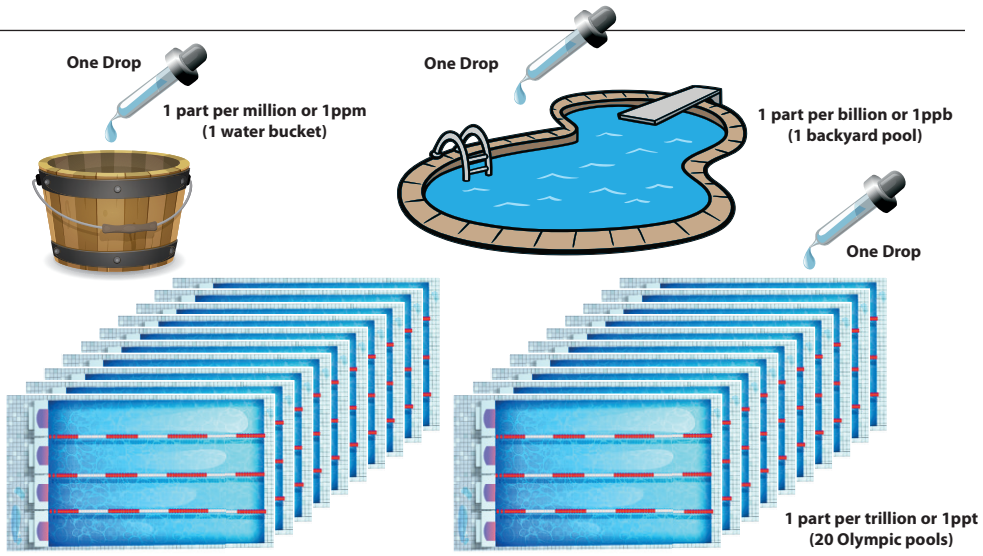
Bromate in Drinking Water Notice

Nagog Pond is currently used seasonally to meet increased water demand during the warmer months. When in operation, this water is treated with ozone to address taste and odor and to enhance disinfection. Ozone can react with bromide, a naturally occurring trace element in surface water, to create bromate, a disinfection byproduct. Bromate is regulated with a maximum contaminant level (MCL) of 10 parts per billion (10 ppb), averaged over any twelve-month period. Some people who drink water containing bromate in excess of 10 ppb over many years have an increased risk of cancer.

The average of the samples of drinking water from Nagog Pond during the summers of 2019, 2020 & 2022 was just less than 11 ppb. Because of these measurements, the Water and Sewer Division was required to send out a Public Notice. However, because Nagog Pond is just one of seven water sources used by Concord, and only supplies drinking water during the summer months, the 12-month average concentration of bromate in Concord's drinking water is about 2 parts per billion (2 ppb), which is well within the allowable limit. Prior to seasonal start-up of the Nagog Pond supply, Concord Water staff will continue to work with our consulting engineers and MassDEP to evaluate existing treatment practices, along with cleaning and lining of the intake pipe to reduce bromate formation. For additional information on bromate, please visit *www.concordma.gov/bromate.*

What is the difference between ppm, ppb and ppt?

It can be hard to wrap our minds around what the concentration of a contaminant actually means. To help visualize different concentrations, imagine that one part per million (1 ppm) is the same as one drop of water in a bucket. At an even smaller concentration, one part per billion (1 ppb) is the same as one drop of water in a backyard size swimming pool and one part per trillion (1 ppt) is the same as one drop of water in 20 Olympic size swimming pools!



WATER QUALITY SUMMARY TERMS & ABBREVIATIONS

AL (Action Level): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements which a water system must follow.

CASRN: Chemical Abstract Services Registry Number

CFU: colony forming units

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.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's 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. MCLG's 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 expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

ND: not detected

NTU: Nephelometric Turbidity Units

ORSG (Office of Research and Standards Guideline): This is the concentration of a chemical in drinking water at or below which adverse health effects are unlikely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.

ppm: parts per million or milligrams per liter (mg/L)

ppb: parts per billion or micrograms per liter (µg/L)

ppt: parts per trillion or nanograms per liter (ng/L)

RAA (Running Annual Average): The average of four consecutive quarters of data.

SMCL (Secondary Maximum Contaminant Level): These standards are developed to protect aesthetic qualities of drinking water and are not health based.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

T.O.N.: threshold odor numbers

Unregulated Contaminants: Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated monitoring is to assist EPA in determining their occurrence in drinking water and whether future regulation is warranted.

90th Percentile: Out of every 10 homes, 9 were at or below this level. This number is compared to the action level to determine lead and copper compliance.

SUMMARY FOOTNOTES

1. **Bromate, Chlorine, Haloacetic Acids & Trihalomethanes:** The highest level detected represents the highest running annual average for these contaminants. The range of levels found may have results in excess of the MCL but the running annual average of all sample locations is used to determine compliance.
2. **Fluoride:** 1969 Town meeting vote authorized the Concord Board of Health to order the upward adjustment of the fluoride content of the water supply available for domestic use in the Town of Concord. Drinking water fluoridation using sodium fluoride began in 1970. As of December 2015, fluoride treatment was decreased from 1.0 ppm to 0.7 ppm in accordance with the United States Department of Health and Human Services' (HHS) recommendation. Fluoride has a secondary contaminant level (SMCL) of 2 ppm to better protect human health.
3. **Turbidity** is a measure of the cloudiness of the water. We monitor it because it is a general indicator of water quality and treatment needs.
4. **Lead and Copper:** In accordance with EPA regulations, Concord Public Works tests the tap water of 30 homes in Concord for lead and copper every 3 years. EPA determines whether the protection against corrosion is sufficient by requiring that at least 90% of the sampled homes have lead levels under 15 parts per billion (ppb). This is called the Action Level.
5. **Per- And Polyfluoroalkyl Substances:** 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.

HELP US HELP YOU.

Sign up to receive important information via the following services.

CODE RED

www.concordma.gov/codered
Emergency Notification System Registration

www.concordma.gov/notifyme
Subscribe to News & Notice Email Updates

Follow us: *@townofconcordma*
Like us: *@townofconcordma*

Cross Connection Control and You

Concord Public Works' Water Rules and Regulations, as well as Massachusetts' drinking water regulations, require that public water systems be protected from potential contamination resulting from cross connections.

What is a cross connection?

A cross connection occurs whenever a potable drinking water line is directly or indirectly linked to a piece of equipment or piping containing non-potable (polluted) water.

Why should I be concerned?

An unprotected or inadequately protected cross connection in your home or workplace could contaminate the drinking water not only in your building, but also in neighboring homes and businesses. Severe illnesses have been caused by cross connection contamination that could have been prevented.

How does this happen?

Typically, this occurs when equipment, plumbing fixtures or attachments, such as garden hoses contain chemicals or water that becomes contaminated over time. When something unexpected happens that alters water pressure in the line or the direction of water flow (like a water main break), contaminants can be sucked from the equipment and back into the drinking water line.

Can it happen at my home?

Outdoor hose bibbs and garden hoses tend to be the most common sources of cross connections at home. The garden hose creates a hazard when submerged in non-potable water such as a swimming pool or when attached to a chemical sprayer for weed killing. Fertilizer, garden chemicals or other materials may contaminate hoses left lying on the ground. Other household cross connections can occur when irrigation systems, boilers, water filtration devices, and fire service systems are connected to the home's plumbing.

How can I be protected?

All industrial, commercial and institutional facilities are annually surveyed to ensure that all potential cross connections are identified and eliminated or protected by a backflow preventer. We also inspect and test these backflow preventers to make sure they are providing maximum protection. At home, do not attach any chemical or non-potable liquid applicators to anything connected to your plumbing system. Outdoors, install hose bibb vacuum breakers on any outside faucet. Owners of irrigation systems are required to have an approved reduced pressure zone assembly (RPZ) installed on the system.

What is a backflow preventer?

A backflow preventer is a mechanical device installed in the plumbing line to prevent the introduction of pollutants or contaminants into the drinking water supply. Types include reduced pressure zone assembly (RPZ), double check valve assembly (DCVA), pressure vacuum breaker assembly (PVB), and "air gap". The simplest type is the "air gap" or simply keeping the end of the water line or hose from coming into direct contact with the vessel being filled with water.

Where can I get more information?

If you need more information, you can contact the Plumbing Inspector's office or CPW's Water & Sewer Division.

Potential Sources of Contaminants

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

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, and 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 can also come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA and MassDEP prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. FDA and the Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of certain substances which the EPA calls "contaminants." The presence of these substances does not necessarily indicate that the water poses a health risk. For example, naturally occurring dissolved minerals are commonly found in well water. More information about the substances found in drinking water and their potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791 or the Massachusetts Drinking Water Program at 1-617-292-5770.

Get Involved

The Public Works Commission oversees the work of Concord Public Works. Their meetings provide an opportunity to become more involved in issues relating to the water system. They typically meet the second Wednesday of each month at 4pm via Zoom. Please check the PWC website for exact dates, times and locations. *www.concordma.gov/529/Public-Works-Commission*

For more information regarding water quality and resource protection initiatives, or if you have a neighborhood concern in a resource protection area (depicted on the map on page 6), please contact Melissa Simoncini, Senior Environmental & Regulatory Coordinator at 978-318-3250 or *msimoncini@concordma.gov*.

WATER QUALITY

Lead & Copper

The detection of unacceptably high lead levels within the Flint, Michigan drinking water system began to draw national media attention in early 2015. This discovery has resulted in increased awareness and concern about drinking water quality across the country. Concord Public Works would like to reassure our customers that we take our responsibility for providing safe and reliable drinking water extremely seriously. We believe it is important to provide you with an update about Concord's ongoing lead and copper protection efforts, along with a brief explanation of what we do to prevent a similar public health crisis from occurring in Concord.

CPW's Water Division treats our drinking water to reduce the natural corrosivity of our local water supplies. We do so by upwardly adjusting the pH by adding potassium hydroxide and enhancing the buffering capacity by adding polyphosphate. These activities raise the pH from slightly acidic to neutral while simultaneously creating a very thin, protective film on the interior walls of water mains and service pipes entering your home. Most importantly, these activities significantly reduce the amount of metals, including lead (if present), that could leach from your private plumbing system into the water carried through it.

These treatment activities are validated in accordance with EPA and MassDEP regulations. A total of 30 homes throughout Concord are sampled once every three years to confirm the effectiveness of our corrosion control efforts. The last round of lead and copper sampling was completed in summer 2023 and will be repeated in summer 2026.

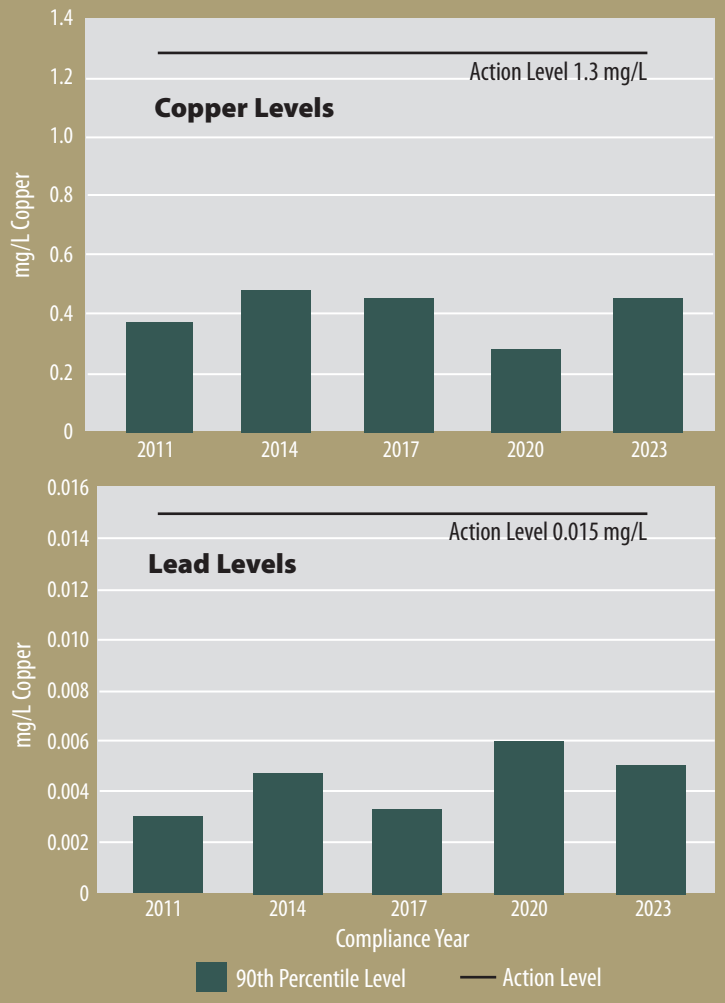
The two graphs on this page summarize the long-term effectiveness of our treatment practices, showing Concord's compliance levels for the past five sampling events. More infrmation is available in the *Water Quality Summary* on page 2.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing fixtures, such as faucets, valves, and solder. CPW is 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, such as first thing in the morning, after work, or upon returning from vacation, 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. To conserve water, other household water usage activities such as showering, washing clothes, and flushing the toilet are also effective methods for flushing pipes and allowing fresh water from the distribution system to enter household pipes.

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 EPA's Safe Drinking Water Hotline and at *http://www.epa.gov/safewater/lead*, or you can visit CPW's website at *www.concordma.gov/lead*.

If you would like information on your service line material, please contact CPW's Water Division at 978-318-3250.

Most residential water service lines in Concord are made of lead, copper, or plastic. Lead service lines are generally a dull gray color and are very soft. You can identify them easily by carefully scratching the service material with a key. If the pipe is made of lead, the area you've scratched will turn a bright silver color.

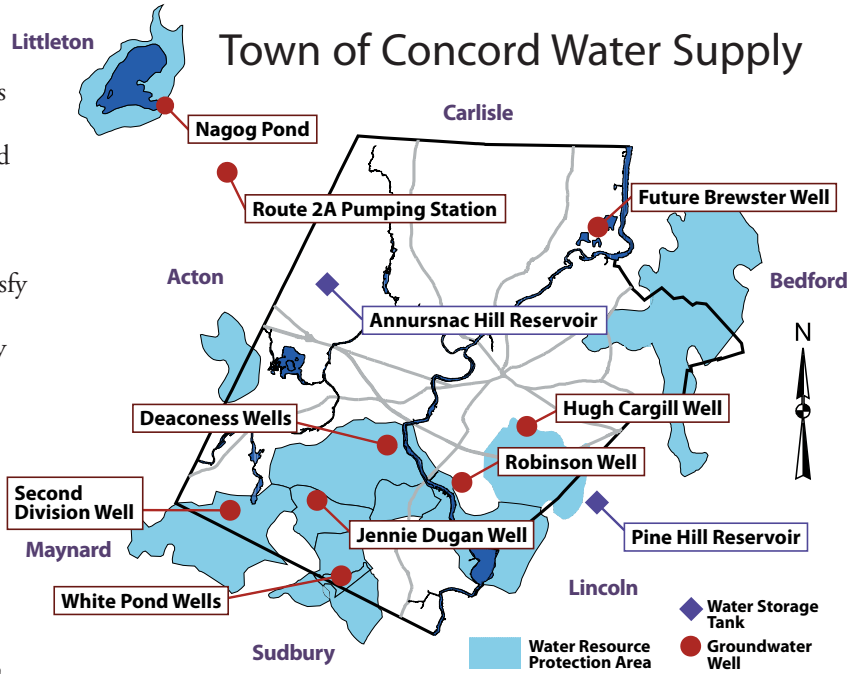


Water Supply

Concord's water system consists of six groundwater supplies located in Concord and one surface water supply located on the Acton/Littleton line. In addition, there are associated pumping stations, two storage reservoirs with a 7.5 million gallon total capacity, approx. 138 miles of water main, and over 1,300 fire hydrants. Depending on the season, all available production facilities may be called upon to satisfy system demands, which may fluctuate between 1.5 million gallons per day (MGD) during the winter months to nearly 4 MGD in the summer months. Concord's public water system is interconnected with Acton and Bedford for emergency backup if necessary.

Water Treatment

In accordance with State and Federal drinking water requirements, Concord's water is treated before it gets to the user's tap. Treatment includes: *disinfection* via the addition of liquid chlorine at all supplies plus ozone/UV light at the Nagog Pond water supply; *corrosion control* via the addition of potassium hydroxide and polyphosphate to raise the natural pH of the water and reduce its corrosiveness to household plumbing; *fluoridation* via the addition of sodium fluoride to help in the prevention of tooth decay; *iron and manganese sequestration* via the addition of polyphosphate to reduce the frequency of discoloration events; and *iron and manganese removal* via pressure filtration for the Deaconess and White Pond wells. Due to the high level of water quality in Nagog Pond, the Town continues to operate this source under a filtration waiver. Chemical adjustments and disinfection are provided as noted in the Source Treatment Table (below) to ensure that safe drinking water is delivered to customer's taps.



Drinking Water and People with Weakened Immune Systems

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline (1-800-426-4791).

SOURCE TREATMENT

	Nagog Pond	Jennie Dugan Well	Deaconess Wells	White Pond Wells	Second Division Well	Robinson Well	Hugh Cargill Well
Source ID	01S	01G	03G, 10G	04G, 08G, 09G	05G	06G	07G
Potassium Hydroxide to Adjust pH for Corrosion Control	♦	♦	♦	♦	♦	♦	♦
Ultra-Violet Light for Disinfection	♦						
Chlorine for Disinfection	♦	♦	♦	♦	♦	♦	♦
Ozone for Disinfection	♦						
Fluoride to Promote Strong Teeth	♦	♦	♦	♦	♦	♦	♦
Polyphosphate for Iron & Manganese Treatment	♦	♦	♦	♦	♦	♦	♦
LayneOx™ Pressure Filtration for Iron & Manganese Removal			♦	♦			
Source Water Protection (SWAP) susceptibility rating*	High	Moderate	High	High	High	High	High

* Susceptibility ratings were developed as a part of the SWAP report and reflect the proximity of potential contaminant sources like farms, golf courses and residential houses to water supplies. The complete swap report is available at 135 Keyes Road or online at *http://www.mass.gov/doc/concord-water-department-swap-report*.

For questions about this report or to learn more about protecting Concord's water supply, contact Melissa Simoncini, Senior Environmental and Regulatory Coordinator at 978-318-3250.