2023 Annual Water Quality Report

(Left) The Water Treatment Plant on the Burlington Waterfront, circa 1908.

(Bottom) The Water Treatment Plant as it looks now. We still still utilize certain areas of the original 1908 structure today.

Burlington Water Resources

A Division of Burlington Public Works

WSID: VT0005053

22 year member

We are pleased to present our annual water quality report. Since 1867, we have been working hard to provide you with the best drinking water. This report is a snapshot of the quality of water that we provided in 2023. Included are details about where your water comes from, what it contains, and how it compares to Environmental Protection Agency (EPA) and state standards. We've also included notable projects and news over the past year. Burlington Water Resources is committed to providing you clean, safe drinking water.

Where Does Your Water Come From?

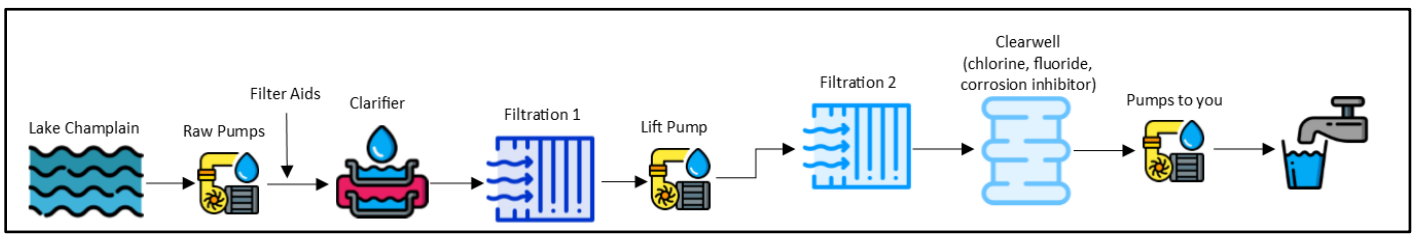
We are fortunate in Burlington to have Lake Champlain as a raw water source. This 12th largest lake in the continental United States provides drinking water for nearly 200,000 people – and recreational opportunities for many, many more. While the high quality of water in the lake makes our drinking water treatment process relatively easy, there are a variety of threats to water quality in the lake. One of the physical characteristics of Lake Champlain that automatically puts it at a disadvantage, compared to the Great Lakes, is the ratio of watershed size to surface area. Our lake has a Watershed-to-Water ratio of nearly 19 to 1 compared to the 3 to 1 ratio of the Great Lakes. This means what we do on land that drains to Lake Champlain has a potentially greater impact than similar land development in the Great Lakes watersheds. In 2020, we updated our Source Water Protection Plan (available for review upon request) that identifies actual or potential sources of contamination within the watershed and includes a general plan to specifically address those threats.

LAKE CHAMPLAIN BY THE NUMBERS	
Water Surface Area	435 square miles
Length	120 miles
Width (at widest point)	12 miles
Average Depth	64 feet
Watershed Size	8,234 square miles

The City of Burlington faces a variety of challenges when it comes to the stewardship of our lake – including a number of State and Federal regulatory requirements. In late 2014, Burlington was one of only five communities across the country selected by the EPA to receive technical assistance and funding to develop an Integrated Water Quality Plan. Integrated Planning allows communities to examine all of their regulatory and environmental challenges, and prioritize improvements based on what will provide the most efficient benefits up front.

How is Your Water Processed?

We filter water twice before sending it out to you. Raw lake water is pumped into our plant from an intake pipe 4200 feet off shore and 45 feet below the water surface. We then add filter aids to enhance the removal of dissolved and particulate matter from lake water throughout the treatment steps. Large particles are removed via gravity and settling in clarifiers and then the water is filtered once through anthracite coal and again through sand to remove smaller particles. We then add chlorine to inactivate any harmful bacteria or viruses that may have made it through our process and to act as a disinfectant throughout the distribution system. Fluoride is added to prevent tooth decay and we add a corrosion inhibitor to keep lead and copper in household plumbing from leaching into the water you drink.



In 2023, we processed and pumped 1.365 billion gallons of water out to you for an annual average daily flow of 3.742 MGD (million gals per day).

What Else Is On Tap?

Here is a summary of notable events for 2023:

- In December, we replaced the sand media in one of our eight main filters (Filtration 2 in the process graphic above) with 0.5mm sand. This is the smallest media size we have ever used and it was subjected to rigorous stress testing under a variety of conditions. We were so impressed with the water quality results that we plan to change the media in our remaining seven filters in 2024.
- The preliminary design work for our new reservoir pump station was completed in 2023 and work continues for an anticipated November 2024 bond vote. The existing pump station dates to 1868 and a new station will increase the reliability of water supply to our high service customers by allowing us to fully utilize our reservoir depth for pumping.
- In late 2023, the water plant was taken offline for nearly 9 hours for electrical switchgear cleaning. This critical maintenance work is performed every 5 years. During times of planned shutdowns and power outages, we provide water to the City through our storage reservoirs.
- We replaced 900 feet and relined 2,500 feet of water mains in select areas of the City. This bond funded project continues in 2024.
- Every water system in the country is required to report to the state and EPA the material of each water service line with a goal of removing all lead-based services. While there is no known lead in any of Burlington's 11,000 water services, we are required to submit a complete service line inventory to the State and EPA by October 16, 2024. To learn more and fill out the survey, please visit www.burlingtonvt.gov/water/SLIP.

Drinking Water Contaminant Definitions and Data

The sources of drinking water (both tap water and bottled water) include surface water (streams, lakes) and ground water (wells, springs). As water travels over the land's surface or through the ground, it dissolves naturally-occurring minerals. It also picks up substances resulting from the presence of animals and human activity. Some "contaminants" may be harmful. Others, such as iron and sulfur, are not harmful. Public water systems treat water to remove contaminants, if any are present. In order to ensure that your water is safe to drink, we analyze it regularly according to regulations established by the U.S. Environmental Protection Agency and the State of Vermont. These regulations set allowable limits for the amounts of various contaminants in drinking water. Different types of contaminates include the following.

- **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 storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- **Pesticides and herbicides**, may come from a variety of sources such as storm water run-off, agriculture, and residential users.
- **Radioactive contaminants**, which can be naturally occurring or the result of mining activity
- **Organic contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and also come from gas stations, urban storm water run-off, and septic systems.

Terms and Abbreviations

The following tables may include unfamiliar terms, please review the definitions below as needed:

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

Corrosion Control Efforts: Treatment (including pH adjustment, alkalinity adjustment, or corrosion inhibitor addition) or other efforts contributing to the control of the corrosivity of water, e.g., monitoring to assess the corrosivity of water.

Disinfection Byproduct (DBP) - Disinfection byproducts are chemical, organic and inorganic substances that may form during a reaction of a disinfectant with naturally present organic matter in the water.

Level 1 Assessment: A level 1 Assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.

Level 2 Assessment: A Level 2 Assessment is a very detailed study of the water system to identify potential problems and determine (if possible) why an E. coli MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.

Locational Running Annual Average (LRAA): The average of sample analytical results for samples taken at a particular monitoring location during four consecutive calendar quarters.

Maximum Contamination Level (MCL): The "Maximum Allowed" MCL is 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.

Maximum Contamination Level Goal (MCLG): The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to human health. MCLG's allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. Addition of a disinfectant may help control microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLG's do not reflect the benefits of disinfectants in controlling microbial contaminants.

Nephelometric Turbidity Unit (NTU): NTU is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Parts per million (ppm) or Milligrams per liter (mg/l): (analogous to one penny in ten thousand dollars)
Parts per billion (ppb) or Micrograms per liter (ug/l): (analogous to one penny in ten million dollars)
Parts per trillion (ppt) or Nanograms per liter (ng/l): (analogous to one penny in ten billion dollars)

Picocuries per liter (pCi/L): a measure of radioactivity in water

Primary and Secondary Drinking Water Standards: Primary standards are established to protect the public against consumption of drinking water contaminants that present a risk to human health, while secondary standards are developed to assist public water systems in managing their drinking water for aesthetic considerations such as taste, color, and odor. Secondary standards have Secondary Maximum Contaminant Levels (SMCL) which are general guidelines that are not enforceable.

Running Annual Average (RAA): The average of 4 consecutive quarters (when on quarterly monitoring); values in table represent the highest RAA for the year.

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

90th Percentile: Ninety percent of the samples are below the action level. (Nine of ten sites sampled were at or below this level).

Per- and polyfluoroalkyl substances (PFAS): PFAS are a group of human-made chemicals that have been in use since the 1940s. PFAS have been found in a wide variety of consumer products and as an ingredient in firefighting foam. PFAS manufacturing and processing facilities, airports, and military installations are some of the contributors of PFAS releases into the air, soil and water. Vermont currently regulates 5 PFAS and this list includes:

- **(PFNA): Perfluorononanoic Acid**
- **(PFOA): Perfluorooctanoic Acid**
- **(PFOS): Perfluorooctane Sulfonic Acid**
- **(PFHpA): Perfluoroheptanoic Acid**
- **(PFHxS): Perfluorohexane Sulfonic Acid**

Water Quality Data

The following tables list all the drinking water contaminants detected during the past year. It also includes the date and results of any contaminants detected within the past five years if analyzed less than once a year. **The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk.**

Detected Primary Drinking Water Contaminants – Burlington Water

Disinfection Residual	RAA	RANGE	Unit	MRDL	MRDLG	Typical Source
Chlorine	0.88	0.040 - 1.81	mg/l	4	4	Water additive to control microbes

Chemical Contaminants	Collection Date	Highest Value	Range	Unit	MCL	MCLG	Typical Source
Fluoride	01/23/2023	0.7	0.2 - 0.7	ppm	4	4	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate	01/09/2023	0.24	0.24 - 0.24	ppm	10	10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits

PFAS Contaminants	
Typical Source	A large group of human-made chemicals used widely in manufacturing and consumer products
MCL	20 (individual or sum of the 5 regulated PFAS compounds)
Units	All units in parts per trillion (ppt)

Collection Date	PFHpA	PFNA	PFHxS	PFOA	PFOS	Sum of 5 regulated PFAS compounds	Comments
10/03/2023	-	-	-	-	-	-	None detected
10/26/2020	-	-	-	-	-	-	None detected
10/03/2019	-	-	-	-	-	-	None detected

***Additional PFAS not regulated by the Vermont Water Supply Rule may have also been detected in the past five years. Please review the section on page 7 about unregulated contaminants.**

Disinfection ByProducts	Collection Year	Highest LRAA	Range	Unit	MCL	MCLG	Typical Source
Total Trihalomethanes	2023	60	37 - 84	ppb	80	0	By-product of drinking water chlorination
Total Haloacetic Acids (HAA5)	2023	34	0 - 43	ppb	60	0	By-product of drinking water chlorination

***The Maximum Contaminant Level (MCL) limit applies to the Locational Running Annual Average (LRAA).**

Lead and Copper	Collection Date	90th Percentile	Range	Unit	AL*	Sites Over AL	Typical Source
Lead	6/2/21 - 7/24/21	2.1	0 - 12.8	ppb	15	0	Corrosion of household plumbing systems; Erosion of natural deposits
Copper	6/2/21 -7/24/21	0.07	0 - 0.14	ppm	1.3	0	Corrosion of household plumbing systems; Erosion of natural deposits

***The lead and copper AL (Action Level) exceedance is based on the 90th percentile concentration, not the highest detected result. This sampling occurs every three (3) years.**

Detected Secondary Drinking Water Contaminants

Secondary standards were developed to assist public water systems in managing their drinking water for aesthetic considerations such as taste, color, and odor. Secondary standards have a Secondary Maximum Contaminant Level (SMCL) which are general guidelines that are not enforceable. All detected secondary contaminants were below the SMCLs. Samples collected 2/7/23.

Contaminant	Detected Value	SMCL	Comments
Alkalinity, Total	60 ppm	None	Alkalinity is the capacity of water to resist changes in ph.
Aluminum	0.12 ppm	0.2 ppm	Source is most likely from one of the filtration aids we need to use.
Calcium	18 ppm	None	Naturally occurring in surface and ground waters. See Hardness.
Chloride	22 ppm	250 ppm	Primary source in Lake Champlain is from salt used in the winter to keep our roads and sidewalks clear.
Conductivity @ 25C	199 µmhos/cm	None	Compounds like metals and chloride make water more conductive. A micromhos/cm is a unit of measure typically used to describe the conductivity of water.
Hardness as CaCo3	64 ppm or 3.7 grains per gal.	None	Composed of dissolved calcium and magnesium. "Hard" water is considered between 151 – 300 mg/l and can stain clothes and fixtures plus make soaps/detergents difficult to lather.
Iron	<0.020 ppm	0.3 ppm	Rusty water, sediment, metallic taste, reddish or orange staining
Magnesium	4.7 ppm	None	Naturally occurring in surface and ground waters. See Hardness.
Manganese	<0.010 ppm	None	Naturally occurring in surface and ground waters.
Sodium	12 ppm	None	Found in water disinfectant and may come from salt use on roads.
Solids, Total Dissolved	89 ppm	500 ppm	Hardness, deposits, colored water, staining, salty taste
Sulfate	13 ppm	250 ppm	Salty taste
Zinc	0.22 ppm	5 ppm	Found in corrosion inhibitor used to control lead & copper.

Monitoring Data for Microbial Contaminants

Annually, over six hundred (600) water samples from our distribution system are analyzed for Total Coliform and *E. Coli* bacteria through an independent certified laboratory to ensure no microbial contaminants are in your water .

Cyanotoxin Monitoring

What are Cyanotoxins?

Cyanotoxins are compounds that are produced by cyanobacteria, also known as blue-green algae. Exposure to cyanotoxins may lead to adverse health effects ranging from mild skin rashes to more serious illness including respiratory and gastrointestinal distress. Exposure to drinking water contaminated with cyanotoxins may cause liver and kidney damage, neurological problems and in rare cases death. Currently the US Environmental Protection Agency does not require monitoring for cyanotoxins. However, the Burlington Water Department participates in a voluntary cyanotoxin monitoring program managed by the State. The program includes testing our raw and finished water for twelve weeks during the summer when cyanobacteria are most likely to be present in the environment, along with protocols and guidance to communities and water systems for addressing suspected cyanobacteria blooms. In 2023, no cyanotoxins were detected. Here in Burlington we are also equipped to add powdered activated carbon (PAC) in our water treatment to remove cyanotoxins if they are suspected of being present in our raw water supply. More information about cyanobacteria and the State's monitoring program is available on the State of VT Department of Environmental Conservation website at Cyanobacteria Guidance & Training | Department of Environmental Conservation.

Monitoring Data for Unregulated Contaminants

Availability of Monitoring Data for samples collected under the fifth Unregulated Contaminants Monitoring Rule (UCMR 5) for the Burlington Department of Public Works.

PUBLIC NOTICE
IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Our Water System has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. There may be Vermont-specific standards for some of these contaminants. The purpose of monitoring for these contaminants is to help the EPA decide whether the contaminants should have a standard. As our customers, you have a right to know that this data is available. We had no reported detections for samples collected under UCMR 5 to date, which includes 29 PFAS compounds plus lithium. For more information, please please contact us at (802) 863-4501 or via email at water-resources@burlingtonvt.gov.

Health Information Regarding Drinking Water

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 microbiological contaminants are available from EPA's Safe Drinking Water Hotline (1-800-426-4791).

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Safe Drinking Water Hotline.

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. The Burlington Department of Public Works, Water Division is responsible for providing high quality drinking water but cannot control the variety of materials used in home and business 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 drinking 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 or at www.epa.gov/safewater/lead.

There are no known lead water services left in Burlington, so lead from samples in homes can only come from historic lead/tin solder used to join copper pipe or plumbing fixtures until around 1985. Since we are required to test for lead and copper at residential and business taps but have no control over plumbing, we use a corrosion inhibitor called zinc orthophosphate that is very effective in preventing the leaching of these metals into your water. This report includes lead and copper data from testing that occurred in 2021. As our water system is required to test for lead and copper every three (3) years, another thirty (30) water samples will be collected and tested in 2024. Complete lead tap sampling data (i.e. each individual sample results) are available for review upon request.

For information about the health effects of PFAS, please visit www.healthvermont.gov/water/pfas or call the Vermont Department of Health at 1-800-439-8550. If you have specific health concerns, please contact your health care provider.

Uncorrected Significant Deficiencies

The system is required to inform the public of any significant deficiencies identified during a sanitary survey conducted by the Drinking Water and Groundwater Protection Division that have not yet been corrected. For more information, please refer to the schedule for compliance in the system's Operating Permit.

Date Identified	Significant Deficiencies	Facility
12/06/2021	Inadequate Security Measures	THE RESERVOIR

This deficiency was the result of the State seeing graffiti at our reservoir. We continue to upgrade security cameras and lighting at this site to prevent unauthorized activity. Future capital improvements will include replacement of the wood retaining wall along Main Street with a higher concrete wall.

Resources

If you have any questions or comments about this report, or would like to request a hard copy, please contact us at (802) 863-4501 or via email at water-resources@burlingtonvt.gov. We encourage you to share and/or post this water quality report with other people who utilize our water, but do not receive the water bill directly (e.g., tenants, multi-unit residential or commercial buildings, etc.)

You can learn more about Burlington's Water Resources Division by visiting: www.burlingtonvt.gov/water. We also have a quarterly newsletter, which is inserted into your bill or available on our website at burlingtonvt.gov/water/ontap for those who go paperless.

If you want to receive notifications about critical, time sensitive events in Burlington, please sign up for a VT-Alert account by visiting: burlingtonvt.gov/BTV-Alerts. This page will guide you through creating an account, choosing categories of interest, and prioritizing contact options to ensure you are getting the most relevant information as soon as possible.