The City of WORCESTER
Public Water Supply # 2348000
18 East Worcester Street
Worcester, MA 01604

2022 Water Quality Report

www.worcesterma.gov 311

English
This is an important notice. Please have it translated.

Greek
Αυτή είναι μια σημαντική ειδοποίηση. Παρακαλουμε να το μεταφρασετε.

Italian
Ciò è un avviso importante. Prego traducalo.

French
C'est une annonce de votre eau potable. Parlez s'il vous plaît avec quelqu'un qui comprend.

Spanish
Esto es un aviso importante. Por favor tenga esto traducido.

Polish
To sprawozdanie zawiera informacje na temat jakości wody, przetłumacz je lub porozmawiaj z osobą która je dobrze rozumie.

Vietnamese
Đây là một thông báo về nước uống của bạn. Xin nói với người mà hiểu.

This report contains important information about your drinking water.

The Worcester Water Operations Division of Worcester's Department of Public Works & Parks is dedicated to providing a safe, reliable, potable water supply today, and to protect the availability of that supply for the future.

Spread the word.

If you are a property owner who rents or leases your property, please forward a copy of this important report to your tenants, or inform them that copies are available at the business office.

Foggy Foliage on the shore of the Holden Two reservoir, as viewed from the Water Filtration Plant

Consumer Confidence Report

We are pleased to say that in 2022, we were able to successfully provide the same high quality of drinking water you have come to expect from Worcester. Here we present to you this year's Water Quality Report for the City of Worcester. The intent of this report is to inform you about your drinking water and provide you with all of the information available on Worcester's drinking water quality. This report represents the calendar year 2022.

Inside this report you will find:

- Where Your Water Comes From
- How Your Water Is Treated
- Water Quality Test Results
- Cross Connection and Conservation Tips

Your Water Meets all Federal and State Standards

We are happy to report that your drinking water meets all federal and state requirements set forth by the *Safe Drinking Water Act.*

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

By continuing to comply with the strict regulations for public water systems, Worcester DPW&P Water Operations can be sure that your drinking water is safe.

Immuno-Compromised Persons

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/ Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Your Water Supply

Worcester obtains its drinking water from 10 surface water sources, or reservoirs, located outside of the City. The watershed for these reservoirs covers 40 square miles. These reservoirs, totaling a combined storage capacity of 7,379.9 Million Gallons (MG) are:

- Lynde Brook Res. (Leicester) 717.4 Million Gallons
- Kettle Brook Res. No. 1 (Leicester) 19.3 MG
- Kettle Brook Res. No. 2 (Leicester) 127.3 MG
- Kettle Brook Res. No. 3 (Leicester, Paxton) 152.3 MG
- Kettle Brook Res. No. 4 (Paxton) 513.7 MG
- Holden Res. No. 2 (Holden) 257.4 MG
- Holden Res. No. 1 (Holden) 729.3 MG
- Kendall Res. (Holden) 792.2 MG
- Pine Hill Res. (Paxton, Holden, Rutland) 2,971.0 MG
- Quinapoxet Res. (Holden, Princeton) 1,100.0 MG

In addition to these 10 active reservoirs, other sources of water supply remain inactive but could be used in the case of an emergency. These additional supplies include two wells and two reservoirs; the Coal Mine Brook Well on Lake Ave North in Worcester and the Shrewsbury Well off Holden Street in Shrewsbury, the Wachusett Reservoir and the Quabbin Aqueduct.

A small area around Mountain Street West is supplied with water purchased from the Town of Holden. This area includes Mountain Street West from #157 to the Holden line (including Stratton Hill Apartments), Maravista Road, Maranook Road, Wendover Road, and the first 500 feet of Lanesboro Road Relocated. These residents will receive a similar Water Quality Report from the Town of Holden.

The **first barrier** of protection for any water supply system is to have clean sources of water. To protect a surface water supply one must control the land within the watershed surrounding the supply. Worcester has maintained very strict control over the land it holds for water supply protection. However, not all of the land in Worcester's watershed is owned or controlled by the City. On some of those privately owned lands activities occur that could pose a threat to water quality in the reservoirs.

The potentially threatening land uses include: dairy farms, livestock operations, manure spreading or storage, pesticide storage and use, railroad tracks, aquatic wildlife, landfills and dumps, power line rights of way, stormwater discharges, highways and roadways. Overall, Worcester's water supplies are considered highly susceptible to contamination.

More information on watershed protection issues is available in the Source Water Assessment & Protection (SWAP) report prepared by DEP in 2002 and available from Worcester DPW&P Water Operations by calling 508-929-1300, or on page 1483 of "Central Region: Source Water Assessment & Protection (SWAP) Program Reports" at www.mass.gov/dep

Water Treatment

Protecting our water sources, while important, is not enough to assure that your tap water is safe to drink. All drinking water, including bottled water, begins as rainfall or snowmelt. As this water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and can pick up substances resulting from the presence of animals or from human activity. Although some of these substances and contaminants will be removed or reduced by natural processes upon reaching a water supply, additional contaminants might directly enter the open waters of the supply.

Water treatment is necessary as the **second barrier** of protection. Treatment will reduce the levels of contaminants to a safe range and can effectively eliminate some substances but will not remove all traces of all possible contaminants. **Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contamination. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791).**

In calendar 2022, the Water Filtration Plant treated 8,302,352,614 gallons of water using the following processes:

- **Ozonation—**Generated on-site, ozone disinfects and breaks down organic matter making the water more efficiently filtered. This is the most effective disinfectant for the parasites giardia and cryptosporidium.
- **Coagulation & Flocculation using alum and cationic polymer**— This makes tiny particles in the water stick together to form larger particles, which can be better trapped in filters.
- **Direct Filtration—**This removes particles from the water using anthracite (a type of coal) as a filter.
- **pH Adjustment**—Lime (calcium oxide) is added to make the water less acidic and less corrosive.
- **Disinfection with Chlorine—** Kills bacteria and other microorganisms.
- **Corrosion Control—**A blended phosphate corrosion inhibitor is added to make the water less corrosive.

Water Quality Testing Results for 2022

The following tables and descriptions provide a complete summary of all contaminants detected in Worcester's water in 2022. The tables may contain several terms and abbreviations that may be unfamiliar to you. To help you better understand these terms, we provide the following important definitions.

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

HRAA: Highest Running Annual Average: the highest average result from quarterly samples taken within the distribution system. This average is used to determine compliance.

MRDLG: Maximum Residual Disinfectant Level Goal: the level of a drinking water disinfectant below which there is no known expected risk to health. This level does not reflect the benefits of the use of disinfectants to control microbial contaminants.

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.

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.

MCL: Maximum Contaminant Level: the highest level of a contaminant that is allowed in drinking water. Set as close to the MCLG's as feasible using the best available treatment technology.

n/a: not applicable.

pCi/L: picocuries per liter (a measure of radiation)

ppm: parts per million; same as milligrams per liter (mg/L)

ppb: parts per billion; same as micrograms per liter (ug/L)

Source Water Quality

Inorganic Contaminants (IOCs):

These chemicals can be naturally present in the rocks and soils surrounding a water supply or result from urban storm water runoff, industrial, or domestic wastewater discharges, oil, and gas production, mining, and farming.

Sodium is not regulated by the USEPA. The DEP Office of Research and Standards (ORSG) has set a state guideline. These concentration levels have been developed to indicate whether further action is necessary to avoid adverse health risks and to protect the aesthetic quality of our drinking water.

The various health effects of IOCs include increased risk of cancer, liver or kidney damage, nerve damage, or intestinal problems, depending on the type of IOC present and the amount ingested.

Worcester's water supply is tested annually for all IOCs after water treatment but before entering the distribution system. Those listed were the only IOCs detectable. They all were at levels below the MCL limit. **Worcester has never exceeded the MCL for any IOCs.**

Per and Polyfluoroalkyl Substances (PFAS): 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. **Recently regulated by the EPA, Worcester tested for these substances in 2022 and we did not exceed the MCL.**

Organic Contaminants: Both VOCs and SOCs: These chemicals are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm runoff, and septic systems.

Worcester's water is tested for VOCs after water treatment but before entering the distribution system. Disinfection byproducts are another type of VOCs but are listed separately in this report.

SOCs were collected this year in the second and fourth quarters of 2022 by collecting samples after treatment but before water entered the distribution system. These contaminants include pesticides, explosives and various other organics. **No SOC's were detected. Worcester's surface water supplies have never exceeded MCLs for any VOC's or SOC's.**

Radioactive Contaminants: These contaminants can be naturally occurring or be the result of oil and gas production. They can enter water supplies from atmospheric fallout, runoff, illegal disposal of radioactive waste, or from contact with natural deposits of radioactive materials such as radon and uranium.

Since Worcester's reservoirs are not in an area of known sources of radioactive materials and have never had radioactive contaminants detected at a level of significance, our water can be tested less frequently.

Though not required in 2022, in the most recent 2016 sample, all measured contaminants were near the detection level for the instrument. **These levels are no cause for concern.**

Substance (Contaminant)	Maximum Level Detected	Range Detected	MCL	MCLG	Typical Source Of Contaminant	Violation
Inorganic Contaminants (IOCs)						
Barium	0.01 ppm	n/a	2 ppm	2 ppm	Erosion of natural deposits	No
Fluoride	<0.03 ppm	n/a	4 ppm	4 ppm	Erosion of natural deposits	No
Nitrate Nitrogen	0.03 ppm	n/a	10 ppm	10 ppm	Erosion of natural deposits, fertilizer, wastewater	No
Sodium	17 ppm	n/a	Unregulated [1] ORSG: 20 ppm	Unregulated [1]	Naturally present in the environment; road salt	No
Per and Polyfluoroalkyl Substances (PFAS)						
PFAS 6	4.9	n/a	20	none	Discharges and emissions from industrial and manufacturing sources in association with the production or use of these PFAS.	No
PFHxA	4.6	n/a	Unregulated [1]	Unregulated [1]		No
Volatile Organic Contaminants (VOCs)						
None detected other than disinfection byproducts (See pg. 4)						
Synthetic Organic Contaminants (SOCs)						
None detected in the samples collected						

[1] Unregulated means that USEPA has not set an MCL for this contaminant

[2] The EPA has set a health advisory for manganese of 0.3 ppm

Distribution Water Quality

Microbiological Contaminants: Bacteria in the Total Coliform group are naturally present in the environment and are not necessarily harmful. We test for this group of bacteria because their presence indicate that conditions are right for the presence of more harmful microorganisms. The City of Worcester monitors for microbiological contaminants by collecting a minimum of 149 water samples in the City each month. Monitoring locations are approved by the Massachusetts Department of Environmental Protection (MassDEP) and are spread throughout the City to ensure that the water being tested is truly representative of the water flowing from consumers' taps. A total of 2081 samples were collected and analyzed for Total Coliform Bacteria in 2022.

Compliance with the MCL for Microbiological Contaminants is having no *E.coli*-positive samples and no treatment technique violations necessitating a sanitary assessment. Compliance with the MCL for *E.coli* still requires routine sample collection and monitoring of Total Coliform Bacteria and each coliform-positive sample is analyzed to determine if *E. coli* is present. **In 2022 there were NO *E. coli* found in Worcester's water and NO sanitary assessments were required.**

Microbial Contaminants (Distribution System)					
Bacteria	Total # Positive	MCL	MCLG	Possible Sources	Violation
E. coli	0 positive	Determined upon additional repeat testing	0 positive	Human and animal fecal waste	No

Disinfection: Chlorine is a disinfectant used to kill bacteria and microorganisms in drinking water. Its use is recognized as one of the most important public health measures ever taken in the modern world. New federal regulations limit the maximum amount of residual chlorine that can be present in the distribution system to 4.0 ppm. **Worcester's water contains about 25% of the maximum allowed.**

Disinfectant/ Disinfectant Byproduct	Maximum Level Detected	Range	MRDL	MRDLG	Typical Source	Violation
Total Chlorine	1.3 ppm [4]	0.1-2.62ppm	4.0 ppm	4.0 ppm	Added during treatment	No
Total Trihalomethanes	56 ppb[5]	13-98 ppb	80 ppb	—	Byproducts of chlorine disinfection	No
Haloacetic Acids	23.75 ppb [5]	3.41– 47 ppb	60 ppb	—	Byproduct of disinfection	No
Turbidity	Maximum Turbidity Measured	Lowest Monthly % of Measurements Below Turbidity Limits	Number of Measurements > 1.0 NTU		Turbidity Limits (Combined For All Filters)	
Turbidity (Combined for all filters)	0.212 NTU	100%	0		Less than or equal to 0.3 NTU in 95% of monthly measurements; No measurement can exceed 1.0 NTU	

[4] Highest Running Annual Average. [5] Highest Locational Running Average

Disinfection Byproducts: Disinfection byproducts are organic compounds produced when chlorine reacts with naturally occurring organic matter. Total trihalomethanes (TTHMs), a group of four compounds, and haloacetic acids (HAAs), a group of five compounds, are monitored in Worcester at eight representative monitoring locations, including locations expected to have the highest levels, on a quarterly basis. Compliance with the MCL is determined by the running annual average at each sampling location during the year (Locational Running Average). Some people who drink water containing THMs in excess of the MCL over the course of many years may experience problems with their liver, kidneys, or central nervous systems and may have an increased risk of getting cancer. Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer. This year, none of the eight locations had single samples that exceeded MRDLs. **Worcester has never exceeded the MCLs for Total Trihalomethanes or Haloacetic Acids.**

Turbidity: Turbidity is a measure of the cloudiness of water in NTU (Nephelometric Turbidity Units) and is an indication of particulate matter, some of which may include harmful microorganisms. It is used primarily to determine the effectiveness of filtration. We measure turbidity continuously at each of the eight filters at the Water Filtration Plant, and as the combined water leaves the Plant. Turbidity itself is not harmful and does not cause illness.

Water entering the Water Filtration Plant has an average turbidity of about 0.80 NTU. The water leaving the Plant and entering the distribution system is at a more consistent level of about 0.05 NTU. **Worcester has never failed the standard for turbidity since the Filtration Plant began regular operation.**

Lead And Copper

For Lead and Copper compliance testing Worcester works cooperatively with the Elm Hill and Woodland Water Districts in Auburn, both of which purchase water from the City.

In 2020 the Worcester-Elm Hill-Woodland system collectively met the standard for lead and copper as did each of the individual water systems. The table below is for the 2020 joint sampling. Worcester will conduct Lead and Copper sampling again in 2023.

System	Contaminant	90 TH Percentile	AL	MCLG	# of Samples Tested	Exceeds AL (Yes/No)	# of Samples Exceeding AL
Combined Results	Lead	3 ppb	15 ppb	0	104	No	2
For All 3 Systems	Copper	0.099 ppm	1.3 ppm	1.3 ppm	104		0
Worcester	Lead	3 ppb	15 ppb	0	89	No	2
	Copper	0.102 ppm	1.3 ppm	1.3 ppm	89		0
Elm Hill	Lead	0 ppb	15 ppb	0	10	No	0
	Copper	0.159 ppm	1.3 ppm	1.3 ppm	10		0
Woodland	Lead	1 ppb	15 ppb	0	5	No	0
	Copper	0..125 ppm	1.3 ppm	1.3 ppm	5		0

Lead and Copper: Worcester's source waters are lead-free. The same is true of the water that travels to your home through pipes, primarily made of iron and steel. Both copper and lead are generally found in water due to materials and components associated with home plumbing, and would typically leach out from the water pipes within your home if the water were corrosive. Lead usually comes from the lead solder used, prior to 1986, to connect copper pipes. The copper comes from the pipes themselves. The 90th percentile, used for compliance purposes in the table above, is a statistical measure used in the Lead and Copper Rule which signifies that out of every 10 samples, 9 were at or below this level.

Copper is an essential nutrient. That said, ingesting elevated levels may upset your stomach, but there are no long-term effects unless you suffer from Wilson's Disease. If this is the case, consult your personal physician. Elevated lead ingestion, on the other hand, may cause serious health problems including kidney problems or high blood pressure in adults. It can also cause problems for pregnant women and young children. Infants and young children are typically more vulnerable to lead and may cause delays in mental and physical development. Lead is therefore strictly regulated in drinking water.

Lead and copper are contaminants that have a very specific and unique set of rules for sampling and testing. Since they enter the water at the point of use (near the tap) sampling and testing for these metals must be done at the homes in the City rather than at the entry point to the distribution system. Samples had to be collected after the water went unused for at least six hours to allow for maximum contact between the water and the lead and copper.

While Worcester DPW&P Water Operations has made great strides in reducing the corrosion of lead into drinking water and is responsible for providing high quality drinking water, we cannot control the variety of materials used in private plumbing components. **When your water has been sitting for several hours unused, you can minimize the potential for lead exposure by flushing your tap for between 30 seconds to 2 minutes before using water for drinking or cooking.** This ensures that you will be getting safe water from the water main rather than water that has been standing stagnant in your plumbing. 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 or at www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water

Other Analysis

The compounds in this table are general measures of water chemistry. **There are no established limits** for these compounds since they are not recognized as having significant health effects at levels found in drinking water. These compounds are sometimes referred to as "secondary contaminants," which signifies that are certain levels some of these may discolor the water or create undesirable taste. Many of these measurements are collected as another way of tracking the effectiveness of Worcester's treatment processes.

SUBSTANCE	AVERAGE	RANGE DETECTED	TYPICAL SOURCE
Alkalinity	14.0 ppm	9-37.4 ppm	Naturally occurring. Buffering capacity of water.
Aluminum	0.049 ppm	0.006-0.050 ppm	Natural sources and water treatment processes.
Calcium	9.6 ppm	6.63-12.4 ppm	Natural Sources and water treatment processes.
Chloride	37.7 ppm	11.9-47.6 ppm	Natural and manmade sources.
Conductivity	186.2 umhos/cm	138-279 umhos/cm	An indirect measure of dissolved solids.
Hardness	29.3 ppm	19.5-35.9 ppm	Naturally occurring. An indirect measure of Calcium and Magnesium.
Iron	0.078 ppm	0.045-0.784 ppm	Natural sources and old water mains.
Orthophosphate	0.536 ppm	0.069-0.801 ppm	Added to water during treatment as corrosion inhibitor.
pH	7.54 units	7.09-8.69 units	Measure of the acidity or basicity of water.
Sulfate	9.2 ppm	7.56-12.2 ppm	Natural sources and water treatment processes.
Temperature	15^0 Celsius	1-28 ^{0}Celsius	Natural processes.
Total Organic Carbon	2.2 ppm	0.87-4.34 ppm	Natural sources.
Total Phosphate	1.00 ppm	0.2-1.31 ppm	Added to water during treatment as corrosion inhibitor.
Zinc	0.006 ppm	0.001-0.028 ppm	Natural sources and some galvanized plumbing material.

Cross Connection Program

A comprehensive cross connection program is the **third barrier** of protection of our water supply. Cross connections occur within the distribution system in all types of buildings including homes, factories, restaurants, and hospitals— to name a few.

Plumbing cross connections exist whenever a pipe carrying drinking water has a direct physical connection to a source of potentially harmful materials. Wherever cross connections exist there is the potential for drinking water contamination. A cross connection can contaminate drinking water in the building where it is located or it can contaminate an entire neighborhood.

⇒ *The most common cross connection found in homes and businesses is at a faucet to which a hose can be attached. This can be easily corrected by installing a **hose bibb vacuum breaker** on the faucet. These devices are inexpensive and are available at most plumbing supply, hardware and home improvement stores.*

Worcester's Cross Connection Survey Program

Massachusetts Drinking Water Regulations 310 CMR 22.22 requires all industrial, commercial and institutional facilities to be surveyed for cross connections and to be re-surveyed in intervals.

Sooner or later DPW&P Water Operations staff or consultants will be visiting your place of business to conduct a cross connection survey. Please understand that this is a necessary and very important program that protects you, your employees, customers and fellow residents and businesses of the City from potentially serious health impacts.

Depending on the complexity of the facility being surveyed, the survey may take a few minutes or a few days. This is a walk through process beginning at the water meter and ending at the last free flowing tap. Also know that if we identify a cross connection you will then have to take steps to either eliminate it or install a backflow preventer to stop reverse flows into the drinking water. When a backflow preventer is installed it is subject to regular inspections and testing by certified Worcester DPW&P Water Operations staff or consultants. **Cross connection surveys are conducted at no cost to the owner or tenant.**

***The Cross Connection program was operated on a very limited basis during 2022 due to staffing restrictions.**

	Commercial	Industrial	Municipal	Institutional
Facilities Requiring Surveys	3074	293	210	1063
Surveys Completed Through 2022	2670	210	207	964

Backflow Preventer Testing in 2021	
Total Number of Reduced Pressure Backflow Preventers (RPBP) in Worcester (2022)	4197
Total Number of Double Check Valve Assemblies (DCVA) in Worcester (2022)	1216
Total Number of Backflow Preventer Tests conducted in Worcester (2022)	1810

For more information on Worcester DPW&P Water Operations' Cross Connection Control Program please call DPW&P Water Engineering at 508-799-1493.

The **fourth barrier** of protection is controlled by **you**.

YOU can help prevent pollution
and protect our water supplies.
—also—
Conserving water doesn't just mean using less water.
It also means using water more efficiently.

- Collect drinking water after the cold water tap has been in use and keep it in the refrigerator. This makes pure, safe and cool drinking water available right when you want it.
- If you accidentally spill chemicals, oil or poison on the ground, clean it up with a rag. **NEVER try to wash it away with water!**

How to Contact the Water Division:

The Water Division's business office is located at 18 East Worcester St., Worcester, MA 01604
Normal business hours are Monday-Friday (holidays excluded) 8:30 a.m.—4:00 p.m.
You may call the City's customer service center (now Worcester 311) with questions during regular business hours at **311**
You may also call this number anytime if you experience a water emergency.
If you experience a service disruption or sudden change in water quality, we want to know about it.
Log on to **www.worcesterma.gov** for detailed information about your water provider.

Additional copies of this report are available upon request.
If you have questions about this report or if your group or organization would like to meet to discuss drinking water issues please call Jaimie Kender, Water Resources Coordinator, at 508-929-1300 x 49350
The latest version of this report is always available on the web at
http://www.worcesterma.gov/water-sewer/document-center/water-quality-report.pdf