

# 2021 Water Quality Report



## BELVIDERE CITY WATER DEPARTMENT

### INTRODUCTION

The City of Belvidere Water Department is providing this informational report, which will be provided to you on an annual basis, as required by the ENVIRONMENTAL PROTECTION AGENCY (E.P.A.). This is to assist you in becoming more knowledgeable about the drinking water that we provide to you. The source of drinking water used by BELVIDERE is Ground Water.

This report is for the year 2021. NOTE! According to the E.P.A. regulations some tests are not taken annually, some are taken every 2 or 3 years. Therefore, all test results are the latest results available.

U.S.E.P.A. has established limits which have been determined to be safe and acceptable. Any Contaminant at or above the established limit or MCL (Maximum Contaminant Level) WILL BE NOTED IN THIS REPORT.

Drinking water, including bottled water may contain at least small amounts of some contaminants.

**The presence of contaminants does not necessarily indicate that the water poses a health risk.**

Should you need additional information about contaminants and potential health effects, you may call the TOLL FREE SAFE DRINKING WATER HOTLINE at 800-426-4791.

## 2021 Water Quality Data

### Definition of Terms

**Avg.:** Regulatory compliance with some MCLs are based on running annual average of monthly samples.

**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 for why total coliform bacteria have been found in our water system on multiple occasions.

**Maximum Contaminant Level Goal (MCLG):** 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.

**Maximum Contaminant Level (MCL):** 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.

**mg/l:** milligrams per litre or parts per million - or one ounce in 7,350 gallons of water.

**ug/l:** micrograms per litre or parts per billion - or one ounce in 7,350,000 gallons of water.

**na:** not applicable.

**Avg:** Regulatory compliance with some MCLs are based on running annual average of monthly samples.

**Maximum Residual Disinfectant Level (MRDL):** The highest level of disinfectant allowed in drinking water.

**Maximum Residual Disinfectant Level (MRDLG):** The level of disinfectant in drinking water below which there is no known or expected risk to health. MRDLG's allow for margin of safety.

**Level Found:** This column represents an average of sample result data collected during the CCR calendar year. In some cases, it may represent a single sample if only one sample was collected.

**Range of Detections:** This column represents a range of individual sample results, from lowest to highest that were collected during the CCR calendar year.

**Date of Sample:** If a date appears in this column, the Illinois EPA requires monitoring for this contaminant less than once per year because the concentrations do not frequently change. If no date appears in this column, monitoring for this contaminant was conducted during the Consumer Confidence Report calendar year.

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

The following information is about frequently asked questions.

**IRON 0.1 - 0.25 AVG PPM**

**HARDNESS - 19 to 28 grains (avg.)**

**WATER TEMPERATURE - 56 degrees (avg.) PH - 7.5 (avg.)**

**1 cubic foot = 62 1/2 pounds 1 cubic foot = 7 1/2 gallons**

**100 cubic feet = 750 gallons**

**Water P.S.I. = 57psi to 90psi with an average of 73.5 psi**

**Note: Water costs \$1.57 per 100 cubic feet or 750 gallons.**

**Or 0.0020933 cents per gallon. Compare that to a gallon of bottled water.**

### Water Quality Data Table Footnotes

#### \*BETA/PHOTON EMITTERS

The MCL for beta particles is 4 mrem/year. EPA considers 50 pCi/l to be a level of concern for beta particles.

**LEAD.** Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to two minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800-426-4791) or <http://www.epa.gov/safewater/lead>

**UNREGULATED CONTAMINANTS.** A maximum contaminant level (MCL) for this contaminant has not been established by either state or federal regulations, nor has mandatory health effects language. The purpose for monitoring this contaminant is to assist the USEPA in determining the occurrence of unregulated contaminants in drinking water, and whether future regulation is warranted.

**FLUORIDE.** Fluoride is added to the water supply to help promote strong teeth. The Illinois Department of Public Health recommends an optimal fluoride range of 0.9 mg/l to 1/2 mg/l.

**IRON.** This contaminant is not currently regulated by USEPA. However, the state has set an MCL for this contaminant for supplies serving a population of 1000 or more.

**MANGANESE.** This contaminant is not currently regulated by USEPA. However, the state has set an MCL for this contaminant for supplies serving a population of 1000 or more.

**SODIUM.** There is not a state or federal MCL for sodium, monitoring is required to provide information to consumers and health officials that are concerned about sodium intake due to dietary precautions, if you are on a sodium-restricted diet, you should consult a physician about this level of sodium in the water.

**NITRATE** in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural run off. Use for an infant, you should ask for advice from your health care provider.

Our water system was required to monitor for the contaminants required under the Unregulated Contaminant Monitoring Rule (UCMR). Results may be obtained by calling the contact listed on the first page of this report.

**\*MCL Statement:** The maximum contaminant level (MCL) for TTHM and HAA5 is 80 pm respectively and is currently only applicable to surface water supplies that serve 10,000 or more people. These MCLs will become effective 01/01/2004 for supplies and surface supplies serving less than 10,000 people. Until 01/01/2004, surface water supplies serving less than 10,000 people, any size water supply that purchase from a surface water source, and groundwater supplies serving more than 10,000 a state imposed TTHM MCL of 100 ppm. Some people who drink water containing trihalomethanes in excess of the MCL over many years experience problems with their livers, kidneys, or central nervous systems, and may have increased risk of getting cancer.

Contaminant (unit of measurement) Typical Source of Contaminant	MCLG	MCL	Highest Level Detected	Range of Levels	Date of Sample

### Regulated Contaminants

#### Disinfectants/Disinfection By-Product

<b>CHLORINE</b> (ppm) Water additive used to control microbes.	MRDLG=4	MRDL=4	0.9	0.6 - 1	2021
<b>TTHMs [Total Trihalomethanes]</b> (ppb) By-product of drinking water chlorination.		80	24	21.1 - 24.2	2021
<b>HALOACETIC ACIDS HAAs</b> (ppb) By-product of drinking water chlorination.		60	12	5.49 - 12.14	2021

#### Inorganic Contaminants

<b>ARSENIC</b> (ppb) Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.	0	10	1.0	0 - 0.541	2019
<b>BARIUM</b> (ppm) Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.	2	2	0.22	0.057 - 0.22	2021
<b>CHROMIUM</b> (ppb) Discharge from steel and pulp mills; Erosion of natural deposits.	100	100	4.0	0 - 12.5	2019
<b>FLUORIDE</b> (ppm) Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.	4	4	0.839	0.54 - 0.839	2021
<b>IRON</b> (ppm) This contaminant is not currently regulated by the USEPA. However, the state regulates erosion for natural deposits.		1	0.62	0.0 - 0.62	2021
<b>MANGANESE</b> This contaminant is not currently regulated by the USEPA. However, the state regulates erosion for natural deposits.	150	150	71	0 - 71	2021
<b>NITRATE (As N)</b> Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits	10	10	3	0 - 2.5	2021
<b>SODIUM</b> (ppm) Erosion from naturally occurring deposits: Used in water softener regeneration.			170	8.3 - 170	2021
<b>ZINC</b> (ppm) This contaminant is not currently regulated by the USEPA. However, the state regulates. Naturally occurring; discharge from metal	5	5	0.047	0 - 0.047	2021

#### Radioactive Contaminants

<b>Combined Radium 226/228</b> Erosion of natural deposits	0	5	3.5	3.5 - 3.5	2020
<b>Gross alpha excluding radon and uranium</b> Erosion of natural deposits.	0	15	6.94	6.94 - 6.94	2021

#### Volatile Organic Contaminants

<b>Tetrachloroethylene</b> Discharge from factories and dry cleaners.	0	5	0.5	0 - 4	2017
<b>Trichloroethylene</b> Discharge from metal degreasing sites and other factories.	0	5	0.5	0 - 0.79	2017

#### Lead and Copper

Contaminant (unit of measurement) Typical Source of Contaminant	Action Level		90th Percentile	# Sites Over AL	Violation	Date of Sample
	MCLG	AL				
<b>COPPER</b> Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems.	1.3	1.3	0.41	0	N	2021
<b>LEAD</b> Corrosion of household plumbing systems; Erosion of natural deposits.	0	15	2	3	N	2021

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

**Action Level Goal:** The level of a contaminant in drinking water below which there is no known or expected risk to health. ALGs allow a margin of safety

## Source Water Assessment Summary

The City of Belvidere (Facility Number 0070050) obtains its water from seven active community water supply wells. Wells #3, #4, #5, #7, #8, #9 and #10. (Illinois EPA11301, 11302, 11303, 11305, 11306, 11307, and 02010 respectively) supply an average of 2,558,000 gallons per day (gpd) to 7412 direct services and 3 satellite service or a population of 25,585. In addition, Belvidere provides source water to Four Seasons 2000 Addition.

To determine Belvidere's susceptibility to groundwater contamination, the following document was reviewed: a well Site Survey, published in 1989 by the Illinois EPA. Based on the information obtained in this document, there are 77 potential sources of groundwater contamination that could pose a hazard to groundwater utilized by Belvidere's community water supply. These include multiple vehicle and engine repair and sales facilities, dry cleaners and hazardous waste storage facilities, electrical and municipal buildings, salvage/construction and demolition company's, above and below ground fuel storage tanks, along with other various potential sources of contamination. In addition, information provided by the Leaking Underground Storage Tank and Remedial Project Management Sections of the Illinois EPA indicated sites with on-going remediation that might be of concern. Based upon this information, the Illinois EPA has determined that the Belvidere Community Water Supply's source water is susceptible to contamination. This determination was based on a number of criteria including: monitoring conducted at the wells; monitoring conducted at the entry point to the distribution system; and the available hydrogeologic data on the wells. As such, the United States Geological Survey (USGS), Illinois District, in cooperation with the Illinois EPA has provided 5 - year recharge area delineations for wells #2, #3, #4, #5, #7 and #9 . Due to lack of sufficient data, the recharge area for well #8 has not been calculated at this time. The land use within the recharge areas of the wells was analyzed as part of this susceptibility determination. This land use includes residential, commercial and agricultural properties.

Further detailed information regarding the susceptibility of Belvidere wells to contamination may be obtained from the following sources: Mills P.C., Halford K.J., and Cobbs R.P. (2002). Delineation of the Troy Bedrock Valley and Particle-Tracking Analysis of Ground-Water Flow Underlying Belvidere, Illinois. Water-Resources Investigations Report 02-4062. Denver, Co: U.S. Geological Survey. Mills P.C., Naximek J.E., Halford K.J. and Yeskis D.J. (2002). Hydrogeology and Simulation of Ground-Water Flow in the Aquifers Underlying Belvidere, Illinois. Water-Resources Investigations Report 01-4100. Denver, CO: U.S. Geological Survey. Mills P.C., Yeskis D.J. and Struab T.D. (1998). Geologic, Hydrologic, and Water-Quality Data from Selected Boreholes and Wells In and Near Belvidere, Illinois, 1989-96. Open-File Report 97-242. Denver, CO: U.S. Geological Survey. Brown T.A., and Mills P.C. (1995). Well-Construction, Hydrogeologic, and Ground-Water Quality data in the Vicinity of Belvidere, Boone County, Illinois. Open-File report 94-515. Denver, CO: U.S. Geological Survey.

The Illinois Environmental Protection Act provides minimum protection zones of 400 feet for Belvidere's wells. These minimum protection zones are regulated by the Illinois EPA. To further reduce the risk to the source water, a maximum protection zone may be established, which is authorized by the Illinois Environmental Protection Act and allows county and municipal officials the opportunity to provide additional potential source prohibitions up to 1,000 feet from their wells.

To further minimize the risk to the city's groundwater supply, the Illinois EPA recommends the following additional activities be considered. First, the water supply staff may wish to revisit their contingency planning. Contingency planning documents are a primary means to ensure that, through emergency preparedness, a community will minimize their risk of being without safe or adequate water. Second, the water supply staff is encouraged to review their cross connection control ordinance to ensure that it remains current and viable. The city's requirement for the user of backflow preventors on new construction and use of reduced pressure zone protection at the city's bulk loading station are good examples of protecting the distribution system from cross connections. Finally, the Illinois EPA recommends that the city investigate additional source water protection management options to address the land use activities within the wells' recharge area. Specifically, these management options should address potential impacts from potential point sources and non-point sources related to agricultural land uses.

To further reduce the risk to source water, Belvidere may wish to implement a wellhead protection program, which includes the proper abandonment of potential routes of ground water contamination within the recharge areas, of the community's wells. Development of appropriate management programs for identified potential sources of contamination and correction of any sanitary defects that might be present at the water treatment facility. This effort may result in the community water supply receiving a special exception permit from the Illinois EPA, which allows a reduction in monitoring and laboratory analysis costs.

**No drinking water quality violations were recorded during 2021.**

## SOME OVERVIEW OF THE BELVIDERE WATER DEPARTMENT

The Water Department is owned and operated by the City of Belvidere and was established in 1891. The water supply comes from 7 wells, wells 3 thru 10. There is 6 deep sandstone aquifers, wells 3 thru 10 and 1 shallow sand and gravel aquifer well #9. Wells 3 and 8 all pump water directly into ground-level reservoirs. The water is then pumped from the reservoirs into the distribution system with booster pumping equipment. The remaining wells 4, 5, 7, 9 and 10 are pumped directly into the distribution system. Well 10 also has an iron filtration system to reduce iron at that well before it is delivered to the customer. There are two 300,000 gallon elevated towers, and one 500,000 gallon water tower for fire protection and to maintain a constant pressure in the system, with 90 pounds of pressure at the main plant. All of the wells are monitored and controlled by a computer monitoring system at the plant for maintaining steady water pressure and any emergencies at the wells. Six of the main wells are equipped for emergency pumping, with portable generator hook-up. The system is capable of producing approximately 13,750,000 gallons in 24 hours. Chlorine is added for purity and to prevent bacteria. Fluoride is added for strong bones and to prevent tooth decay. Orth-phosphate is added to control rust and iron. The Department strides in High Professional Standard in maintaining quality water and service to its customers. The Department has received certificates from Illinois Environmental Protection Agency and the Illinois Department of Public Health. The water department employs 13 people, 6 people on the digging crew, for maintaining the water and sewer system, 4 people on the distribution system for water sampling, customer assistance, well maintenance, and 3 secretary/clerical clerks. Additional information or concerns pertaining to the water quality or service may be obtained by calling the water superintendent at the Belvidere Water Department at 865-544-6622

Here is a list of contaminants that have the potential of being present in the water source.

**Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agriculture live stock 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**, which may come from a variety of sources such as agriculture, urban storm water 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 storm water runoff, and septic systems.

**Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

"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 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 **Safe Drinking Water Hotline (800-426-4791)**. *Cryptosporidium* is not currently known to be found in ground water supplies.

### MICROBIOLOGICAL CONTAMINANTS

These samples are taken to determine the presence of Total Coliform Bacteria, Fecal Coliform, and E. Coli.

There are 84 raw water samples taken (sample taken at well before chemicals added). 36 finished water samples taken (samples taken after chemicals are added, but before entering the distribution system). 360 Distribution samples taken (samples taken evenly throughout the system). This totals 480 samples per year, or 40 per month. The amount of samples are determined by the population and are required by the E.P.A. The Water Department also takes one sample at the well and one near the well to help maintain an even amount of chlorine and fluoride throughout the system, 365 days a year.

#### **Unit of Measurement - Definition**

ppt - Parts per trillion, or nanograms per liter  
ppm - Parts per million, or milligrams per liter  
ppb - Parts per billion or micrograms per liter  
# pos/mo - Number of positive samples per month  
pCi/l: picoCuries per liter (measurement of radioactivity)



Dear Water System Customer,

The Illinois Environmental Protection Agency (Illinois EPA) recently tested our water system for compounds known as Per- and Polyfluoroalkyl Substances (PFAS) as part of a statewide investigation of community water supplies. PFAS are a group of thousands of manmade substances that have been produced in the United States since the 1940s and utilized for a variety of applications ranging from water and stain-proofing to firefighting. Some PFAS have been phased out of production due to environmental and human health concerns, yet they persist in the environment and may contaminate surface and ground waters.

Neither the Illinois EPA nor the U.S. EPA have yet developed enforceable drinking water standards for PFAS. In the interim, Illinois EPA has developed health-based Draft Guidance Levels for the small number of PFAS for which there is appropriate information to do so. There is not enough information available to scientists to develop health-based Draft Guidance Levels for most PFAS. Draft Guidance Levels are intended to be protective of all people consuming the water over a lifetime of exposure. It is important to understand that Draft Guidance Levels are not regulatory limits for drinking water. Rather, the Draft Guidance Levels are benchmarks against which sampling results are compared to determine if additional investigation or other response action is necessary.

Illinois EPA testing has determined that one or more PFAS were detected in our water system at values greater than or equal to the Illinois EPA health-based Draft Guidance Levels, as provided in the table below.

<b>PFAS Analyte</b>	<b>Acronym</b>	<b>Draft Guidance Level</b>
Perfluorobutanesulfonic acid	PFBS	0.14 mg/L (140,000 ppt)
Perfluorohexanesulfonic acid	PFHXS	0.00014 mg/L (140 ppt)
Perfluorononanoic acid	PFNA	0.000021 mg/L (21 ppt)
Perfluorooctanesulfonic acid	PFOS	0.000014 mg/L (14 ppt)
Perfluorooctanoic acid	PFOA	0.000000002 mg/L (2 ppt)
Perfluorohexanoic acid	PFHXA	0.00056 mg/L (560,000 ppt)
Hexafluoropropylene oxide dimer acid	HFPO-DA	0.00000056 mg/L (560 ppt)

Our water may contain other PFAS at concentrations greater than or equal to the minimum reporting levels. However, neither the Illinois EPA nor the U.S. EPA currently have Draft Guidance Levels for these additional compounds.

PFAS are present in many consumer goods, including food packaging and personal care products, and scientists have found values of PFAS in blood of nearly all individuals tested. Exposure to high levels of PFAS may cause adverse health effects such as increased cholesterol levels, increased risk for thyroid disease, low infant birth weights, reduced response to vaccines, pregnancy-induced hypertension and increased risk of liver and kidney cancer as seen in studies of laboratory animals. Exposure to PFAS above the recommended Draft Guidance Levels does not guarantee that a person will get sick or an adverse health effect will occur. Draft Guidance Levels are conservative estimates. The possible health effects from PFAS are dependent on how much a person is exposed

to and how long they are exposed to it. Exposure to PFAS above recommended Draft Guidance Levels for periods of time may mean that a person is at a greater risk of experiencing these adverse effects.

Belvidere City Water Dept. has taken measures to respond to the results of this testing. As a proactive measure(s) to protect our drinking water supply, Belvidere City Water Dept. is working to:

- PLACEHOLDER | SITE SPECIFIC RESPONSE ACTIONS
- continue to monitor PFAS values through quarterly sampling
- identify which water source intake/well is affected
- isolate the affected water source intake to reduce levels

Based on these initial results, Belvidere City Water Dept. has started additional sampling and will keep the community updated and informed. Additional information regarding PFAS, the statewide PFAS investigation network, and the impact to public health can be found in the attached fact sheet as well as on the Illinois EPA PFAS webpage:

<https://www2.illinois.gov/epa/topics/water-quality/pfas/Pages/default.aspx>

The confirmed sampling results for Belvidere City Water Dept. are also available on Illinois EPA's Drinking Water Watch system at <https://water.epa.state.il.us/dww/index.jsp>

### PFAS Detections

In 2021, our PWS was sampled as part of the State of Illinois PFAS Statewide Investigation. Results from this sampling indicated PFAS were detected in our drinking water above the health advisory level established by Illinois EPA. Two wells were taken offline for trace amounts detected. Follow up monitoring is being conducted. For more information about PFAS health advisories

<http://www2.illinois.gov/epa/topics/water-quality/pfas/Pages/pfas-healthadvisory.aspx>

PFAS Analyte	Acronym	Guidance Level (ppt)	Your Results (ppt)	
			TP01 Collected 10/26/2020	TP01 Collected 11/18/2020
Perfluorobutanesulfonic acid	PFBS	140,000	6.2	6.4
Perfluorohexanesulfonic acid	PFHxS	140	18	22
Perfluorononanoic acid	PFNA	21	ND	ND
Perfluorooctanesulfonic acid	PFOS	14	7.3	8.2
Perfluorooctanoic acid	PFOA	2	<b>6.6</b>	<b>6.8</b>
Perfluorohexanoic acid	PFHxA	560,000	5.5	6.6
Hexafluoropropylene oxide dimer acid	HFPO-DA	560	ND	ND
Perfluoroheptanoic acid	PFHpA	None	3.4	3.6

Minimum Reporting Level (MRL) = 2.0 ng/L

ND = Not Detected

Nanograms per Liter (ng/L) = Parts per Trillion (ppt)

Bold text represents values exceeding guidance levels

If you have questions, please contact:

CWS point of contact

Illinois Environmental Protection Agency

Barb Lieberoff, Office of Community Relations

[epa.pfas@illinois.gov](mailto:epa.pfas@illinois.gov)

217-524-3038

Illinois Department of Public Health

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