Water Treatment Plant

501 N. Lakeshore Dr. Ludington, MI 49431

Jamie Hockemeyer (231) 843-8830

2021 Drinking Water Quality Report

Drinking Water

Water is a necessity for every home and business. The City of Ludington is dedicated to providing safe and abundant drinking water to all residents and customers.

Every year, a Consumer Confidence Report (also known as the Annual Drinking Water Quality Report) for the City of Ludington's public water system is provided to federal and state regulatory agencies, the local health department, and all water customers. The City of Ludington is once again pleased to share that the drinking water meets all federal and state requirements. Details are included in this report.

If you have any questions about this report or your water quality, please contact Jamie Hockemeyer Water Treatment Plant Superintendent at (231) 843-8830. If you want to learn more about the operation of City government, please attend any of the regularly scheduled City Council meetings which are held at 6:30 p.m. on the second and fourth Monday of every month in the Council Chamber at City Hall 400 S. Harrison St. Ludington, MI 49431.

The City of Ludington routinely monitors for contaminants in drinking water according to federal and state laws and sampling directives. The "2021 Water Quality Results Table" found on pages 4 and 5 shows the results of monitoring during the period of January 1 - December 31, 2021 (unless noted). Additional information is provided on pages 6-14.

Drinking water, including bottled water, may be reasonably expected to contain at least small amounts of contaminants. The presence of contaminants does not necessarily indicate the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the United States Environmental Protection Agency (US EPA) Safe Drinking Water Hotline at 1-800-426-4791 or the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) Environmental Assistance Center (EAC) at 1-800-662-9278.

Source Water

The sources of drinking water (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and aquifers. As water travels over the surface of the land or through the ground, it naturally dissolves, can take on minerals, in some cases, radioactive material, and substances resulting from the presence of animals or from human activity. Source water for the City of Ludington and customers supplied in the City of Scottville, Pere Marquette Charter Township, Amber Township, Victory Township, and West Shore Community College is drawn through two different intake structures in Lake Michigan and treated at the City of Ludington Water Treatment Plant located at 501 N. Lakeshore Drive Ludington, MI 49431.

EGLE performed an assessment of the city's source water in 2003 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tier scale from "very-low" to "very-high" based primarily on geologic sensitivity, water chemistry, and contamination sources. The susceptibility of the intakes to potential contamination is moderate. An effort has been made to protect our source water by creating, implementing, and updating a Surface Water Intake Protection Plan (SWIPP).

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Individuals with Special Health Needs

For those individuals with special health issues and concerns, the following information contains US EPA water use guidelines which may be applicable. Some people may be more vulnerable to contaminants in drinking water than others. Immuno-compromised persons include those undergoing chemotherapy, those who have had an organ transplant, people with HIV/AIDS or other immune system disorders, the elderly, and infants. These individuals should seek advice about drinking water from their health care provider.

Guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants can be obtained by calling the US EPA Safe Drinking Water Hotline at 1-800-426-4791, EGLE EAC at 1-800-662-9278, or the Centers for Disease Control and Prevention (CDC) at 1-800-232-4636.

Possible Contaminants Present in Source Water

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

In order to ensure tap water is safe to drink, the US EPA and EGLE prescribe regulations limiting the amount of certain contaminants in water provided by public water systems. US Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Water Treatment and Distribution

The City of Ludington operates an 8.0 million gallon per day capacity conventional treatment facility which is staffed by a team of 7 licensed operators and the Water Treatment Plant Superintendent (operator in charge). This facility operates 24 hours a day – 7 days a week and uses coagulation, flocculation, sedimentation, and filtration treatment processes to provide high quality aesthetically pleasing drinking water for the community. Approximately 1,079,062,000 gallons were produced in 2021.

The distribution system is comprised of elevated storage tanks, ground storage reservoirs, miles of watermain ranging from 4 inch to 20 inch in diameter, watermain valves, curb-stop valves, hydrants, and service line connections. This system provides reliable and abundant water for consumption, hygiene, cleaning, and fire-fighting capabilities for the community. The distribution system is maintained by a team of 4 licensed operators and overseen by the Department of Public Works (DPW) Superintendent.

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Glossary of Terms and Abbreviations

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

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

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water per primary drinking water regulations. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

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 Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water per primary drinking water regulations. There is convincing evidence that addition of a disinfectant is necessary for control of 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. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable.

Nephelometric Turbidity Unit (NTU): Turbidity is a measure of the clarity of the water. We monitor turbidity because it is a good indicator of the effectiveness of our filtration system. Turbidity in excess of 5.0 NTU is just noticeable to the average person.

Non-Detect (ND): the contaminate is not present.

Parts per million (ppm) or Milligrams per liter (mg/L): A measure of the concentration of a contaminant in water. One part per million is equivalent to one minute in two years, or one inch in sixteen miles.

Parts per billion (ppb) or Micrograms per liter (µg/L): A measure of the concentration of a contaminant in water. One part per billion is equivalent to one minute in 2,000 years, or one inch in sixteen thousand miles.

Parts per trillion (ppt) or Nanogram per liter (ng/L): A measure of the concentration of a contaminant in water. One part per trillion is equivalent to one drop of water in 20 Olympic-size swimming pools.

Reporting Level (RL): The minimum concentration that can be reported as a quantitated valve for a sample following laboratory analysis.

Running Annual Average (RAA): The average of analytical results for samples obtained during the calendar year.

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

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2021 Water Quality Results Table

Regulated Monitoring at the Treatment Plant

Contaminate	Units	Range Detected	Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Antimony	ppm	ND	ND	0.006	0.006	No	2021	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	ppm	ND	ND	0.010	0	No	2021	Erosion of natural deposits; runoff from orchards, runoff from glass and electronics production wastes
Barium	ppm	0.02	0.02	2	2	No	2021	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	ppm	ND	ND	0.004	0.004	No	2021	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	ppm	ND	ND	0.005	0.005	No	2021	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium	ppm	ND	ND	0.1	0.1	No	2021	Discharge from steel and pulp mills; erosion of natural deposits
Cyanide	ppm	ND	ND	0.2	0.2	No	2021	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Glyphosate	ppm	ND	ND	0.7	0.7	No	2021	Runoff from herbicide use
Gross Alpha	pCi/L	1.93	1.93	15	0	No	2018	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Mercury	ppm	ND	ND	0.002	0.002	No	2021	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Nitrate	ppm	0.31	0.31	10	10	No	2021	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Nitrite	ppm	ND	ND	1	1	No	2021	
PFAS (see page 6)	ppt	ND - 2.6	2.4	Multiple	NA	No	2021	Fire suppression foam; household products
Radium 226 & 228 (combined)	pCi/L	0.74	0.74	5	0	No	2018	Erosion of natural deposits
Selenium	ppm	ND	ND	0.05	0.05	No	2021	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
SOC (see page 9)	ppt	ND	ND	Multiple	Multiple	No	2021	Industrial discharge, Agricultural chemicals
Thallium	ppm	ND	ND	0.002	0.0005	No	2021	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories
Total Organic Carbon [2]	ppm	1.4 - 1.6	1.5	TT	NA	No	2021	Naturally present in the environment
Total Xylenes	ppm	ND	ND	10	10	No	2021	Leaks and spills from gasoline and petroleum storage tanks
Turbidity [1]	ntu	0.02 - 0.07	0.02	TT=1	NA	No	2021	Soil run-off, suspended matter in lake water

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2021 Water Quality Results Table (continued)

Regulated Monitoring in the Distribution System

Contaminate	Units	Range Detected	Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Fluoride	ppm	0.60 - 0.78	0.71	4	4	No	2021	Water additive which promotes strong teeth
Free Chlorine Residual [4]	ppm	0.34 - 1.76	1.13	**MRDL**=4	**MRDLG**=4	No	2021	Used to disinfect drinking water
Haloacetic Acids [3]	ppb	12.9 - 27.4	20.0	60	0	No	2021	Formed when chlorine is added to water with naturally occurring organic material
Total Trihalomethane [3]	ppb	24 - 51	39.0	80	0	No	2021	

Contaminate	Units	Range Detected	90th Percentile	AL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Copper [5]	ppm	ND - 0.043	0.0	1.3	1.3	No	2020	Corrosion of household plumbing system
Lead [5]	ppb	ND - 2.7	2.0	15.0	0	No	2020	Corrosion of household plumbing system

Unregulated Monitoring

Contaminate	Units	Range Detected	Average Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Calcium	ppm	35.0	35.0	NA	NA	No	2021	Erosion of natural deposits
Chloride	ppm	12 - 30	17.3	NA	NA	No	2021	Erosion of natural deposits and run-off
Iron	ppm	ND	ND	NA	NA	No	2021	Erosion of natural deposits
Magnesium	ppm	12.0	12.0	NA	NA	No	2021	Erosion of natural deposits
Nickel	ppm	ND	ND	NA	NA	No	2021	Erosion of natural deposits, household plumbing
Sodium	ppm	9.8	9.8	NA	NA	No	2021	Erosion of natural deposits
Sulfate	ppm	24 - 30	26.6	NA	NA	No	2021	Erosion of natural deposits

Footnotes [x]:

1. Turbidity is a measurement of water clarity. We monitor turbidity because it is a good indicator of our filtration process. The turbidity measurements must be less than or equal to 0.3 ntu in 95% of all samples taken each month and shall never exceed 1 ntu at any time.

2. The level detected shown for Total Organic Carbon (TOC) is the running annual average calculated quarterly.

3. The level detected shown for Total Trihalomethanes (TTHM) and Haloacetic Acids (HAA5) is the running annual average calculated quarterly.

4. The level detected shown for Free Chlorine Residual was calculated using a running annual average.

5. Collected from 21 homes that met the EGLE Tier 1 Site criteria (single family residence with lead service line). Utilized 1st & 5th Liter Method.

No Maximum Contaminate Level (MCL) Violations

As shown in the 2021 Water Quality Results Table there are no MCL violations and the City of Ludington's drinking water meets or exceeds all Federal and State requirements. More information about contaminants and potential health effects can be obtained by calling the US EPA Safe Drinking Water Hotline at 1-800-426-4791 or EGLE EAC at 1-800-662-9278.

MCLs are set at very stringent levels. To understand the possible health effects described for many regulated contaminates, a person would have to drink two (2) liters of water every day, which is approximately eight (8) - 8-ounce glasses of water, at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

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PFAS (Regulatory Sampling)

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that include PFOA, PFOS, GenX, and many other chemicals. PFAS compounds have been manufactured and used in a variety of industries in the United States since the 1940s. Products that contain PFAS include: fire-fighting foams, stain repellents, nonstick cookware, waterproof clothing, food wrappers, fabric softeners, and many other products.

Per the new EGLE PFAS rule that took effect in August 2020 under the Michigan Safe Drinking Water Act (MSDWA), enforceable primary drinking water standard maximum contaminate levels (MCL) for 7 PFAS compounds were promulgated and the City of Ludington was required to start monitoring for PFAS quarterly in 2021. Samples were analyzed by a Michigan-based certified contracted laboratory.

Table summarizing results of this monitoring:

2021 Drinking Water Compliance Sampling Results for PFAS

PFAS Compound	*MCL (ppt)*	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Violation?
PFBS	*420*	ND	ND	ND	ND	No
PFHxA	*400,000*	ND	ND	ND	ND	No
HFPO-DA	*370*	ND	ND	ND	ND	No
PFHxS	*51*	ND	ND	ND	ND	No
PFHpA	*None*	ND	ND	ND	ND	No
ADONA	*None*	ND	ND	ND	ND	No
PFOA	*8*	ND	ND	ND	ND	No
PFOS	*16*	2.4 ppt	2.3 ppt	2.6 ppt	ND	No
PFNA	*6*	ND	ND	ND	ND	No
9Cl-PF3ONS	*None*	ND	ND	ND	ND	No
PFDA	*None*	ND	ND	ND	ND	No
NMeFOSAA	*None*	ND	ND	ND	ND	No
NEtFOSAA	*None*	ND	ND	ND	ND	No
PFUnA	*None*	ND	ND	ND	ND	No
11Cl-PF3OUdS	*None*	ND	ND	ND	ND	No
PFDoA	*None*	ND	ND	ND	ND	No
PFTrDA	*None*	ND	ND	ND	ND	No
PFTA	*None*	ND	ND	ND	ND	No

Sample Collected at the Entrance Point to the Distribution System (EPTDS) at the Water Treatment Plant

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PFAS (Non-Regulatory Investigative Sampling)

In 2021, EGLE and the Michigan PFAS Action Response Team (MPART) continued their proactive efforts to investigate PFAS contamination in Michigan by continuing the voluntary, state funded, monitoring program of public water system source water. This investigative monitoring program was separate from the regulatory sampling required by the new EGLE PFAS rule. The City of Ludington elected to participate again in this voluntary monitoring program. Samples were collected and analyzed by EGLE's contractor AECOM.

Table summarizing results of this monitoring:

State of Michigan EGLE 2021 Voluntary Surface Water Intake PFAS Sampling Initiative						
PFAS Compound	**1/18/2021**	**3/3/2021**	**5/24/2021**	**7/21/2021**	**9/9/2021**	**11/23/2021**
PFBS	ND	ND	ND	ND	ND	ND
PFHxA	ND	ND	ND	ND	ND	ND
HFPO-DA	ND	ND	ND	ND	ND	ND
PFHxS	ND	ND	ND	ND	ND	ND
PFHpA	ND	ND	ND	ND	ND	ND
ADONA	ND	ND	ND	ND	ND	ND
PFOA	2 ppt	ND	ND	ND	ND	ND
PFOS	ND	ND	ND	ND	ND	ND
PFNA	ND	ND	ND	ND	ND	ND
9Cl-PF3ONS	ND	ND	ND	ND	ND	ND
PFDA	ND	ND	ND	ND	ND	ND
NMeFOSAA	ND	ND	ND	ND	ND	ND
NEtFOSAA	ND	ND	ND	ND	ND	ND
PFUnA	ND	ND	ND	ND	ND	ND
11Cl-PF3OUdS	ND	ND	ND	ND	ND	ND
PFDoA	ND	ND	ND	ND	ND	ND
PFTrDA	ND	ND	ND	ND	ND	ND
PFTA	ND	ND	ND	ND	ND	ND

Sample Collected from the Source Water Intakes in Lake Michigan
Prior to Treatment at the Water Plant

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Lead

Information about lead: 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 City of Ludington 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, 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 have a lead service line it is recommended that you run your water for at least 5 minutes to flush water from both your home plumbing and the lead service line. 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 http://www.epa.gov/safewater/lead

Lead in drinking water is rarely the sole cause of lead poisoning, but it can add to a person's total lead exposure. All potential sources of lead in the household should be identified and removed, replaced or reduced.

Information on lead in drinking water, paint, soil, testing methods, and steps to take to minimize exposure are available by calling US EPA Safe Drinking Water Hotline at 1-800-426-4791, EGLE EAC at 1-800-662-9278, or District Health Department #10 at 231-845-7381.

Lead and copper sampling in drinking water takes place every 3 years per regulatory requirements of the US EPA and EGLE Lead and Copper Rule (LCR). Regulatory sampling for the City of Ludington was last completed in 2020 and will take place again in 2023. Voluntary exploratory sampling takes place annually. Residents selected for this sampling will be contacted by the City of Ludington Water Treatment Plant Superintendent by mail.

Lead Service Lines & Distribution System Material Inventory

The City of Ludington is currently working with residents and contractors to both identify and replace lead service lines per requirements of the EGLE Revised Lead and Copper Rule.

At this point in time:

- 4,445 total services lines in the distribution system.
- 1,761 of those have been identified as meeting the lead service line criteria.
- 1,578 are considered unknown service lines (need to identify material).

In 2021, 81 lead service lines were replaced with copper at a cost of $444,954.

Roughly 100 more lead service lines are scheduled for replacement in 2022. This work will continue into the future until all lead service lines are replaced in our water system.

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Synthetic Organic Contaminates (Herbicides, Pesticides, & Carbamates)

2021 Drinking Water Compliance Sampling Results for SOC				
SOC Compound	**MCL**	**Reporting Level (RL)**	**Results**	**Violation?**
2,4,5-T	NA	0.5 ppb	ND (below RL)	No
2,4,5-TP (Silvex)	0.05 ppm	0.1 ppb	ND (below RL)	No
2,4-D	0.07 ppm	0.1 ppb	ND (below RL)	No
3-Hydroxycarbofuran	NA	0.5 ppb	ND (below RL)	No
Acifluorfen	NA	1.0 ppb	ND (below RL)	No
Alachlor	0.002 ppm	0.1 ppb	ND (below RL)	No
Aldicarb	NA	0.5 ppb	ND (below RL)	No
Aldicarb sulfone	NA	0.7 ppb	ND (below RL)	No
Aldicarb sulfoxide	NA	0.5 ppb	ND (below RL)	No
Aroclor 1016 - 1260	NA	0.08 - 0.26 ppb	ND (below RL)	No
Atrazine	0.003 ppm	0.1 ppb	ND (below RL)	No
Baygon	NA	0.5 ppb	ND (below RL)	No
Bentazon	NA	0.5 ppb	ND (below RL)	No
Benzo(a)pyrene (PAHs)	0.0002 ppm	0.02 ppb	ND (below RL)	No
Carbaryl	NA	0.5 ppb	ND (below RL)	No
Carbofuran	0.04 ppm	0.9 ppb	ND (below RL)	No
Chlordane	0.002 ppm	0.1 ppb	ND (below RL)	No
Dalapon	0.2 ppm	1.0 ppb	ND (below RL)	No
DCPA Acid Metabolites	NA	0.5 ppb	ND (below RL)	No
Di(2-ethylhexyl) adipate	0.4 ppm	0.6 ppb	ND (below RL)	No
Di(2-ethylhexyl) phthalate	0.006 ppm	0.6 ppb	ND (below RL)	No
Dicamba	NA	0.1 ppb	ND (below RL)	No
Dinoseb	0.007 ppm	0.1 ppb	ND (below RL)	No
Endrin	0.002 ppm	0.01 ppb	ND (below RL)	No
Gamma-BHC (Lindane)	0.0002 ppm	0.02 ppb	ND (below RL)	No
Glyphosate	0.7 ppm	6.0 ppb	ND (below RL)	No
Heptachlor	0.0004 ppm	0.04 ppb	ND (below RL)	No
Heptachlor epoxide	0.0002 ppm	0.02 ppb	ND (below RL)	No
Hexachlorobenzene	0.001 ppm	0.1 ppb	ND (below RL)	No
Hexachlorocyclopentadiene	0.05 ppm	0.1 ppb	ND (below RL)	No
Methiocarb	NA	1.0 ppb	ND (below RL)	No
Methomyl	NA	0.5 ppb	ND (below RL)	No
Methoxychlor	0.04 ppm	0.1 ppb	ND (below RL)	No
Metolachlor	NA	0.1 ppb	ND (below RL)	No
Oxamyl (Vydate)	0.2 ppm	1.0 ppb	ND (below RL)	No
Pentachlorophenol	0.001 ppm	0.04 ppb	ND (below RL)	No
Picloram	0.5 ppm	0.1 ppb	ND (below RL)	No
Simazine	0.004 ppm	0.07 ppb	ND (below RL)	No
Toxaphene	0.003 ppm	1.0 ppb	ND (below RL)	No
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US EPA UCMR

The US EPA Unregulated Contaminant Monitoring Rule (UCMR) samples public water systems nationwide to collect data for contaminants which are suspected to be present in drinking water and do not currently have health-based standards set under the Safe Drinking Water Act (SDWA). Every 5 years, US EPA issues a new list of no more than 30 unregulated contaminates to be monitored by public water systems and analyzed by certified contracted laboratories.

Based on population served by the public water system and their respective source water type (surface water, ground water, or ground water under direct influence of surface water), US EPA follows the National Sample Assessment Monitoring Design and randomly selects which public water systems will be participating and which of the 30 unregulated contaminates they will sample for.

UCMR 5 (2023-2025) was published on December 27th 2021. The 30 contaminants to be monitored for during UCMR 5 include 29 Per- and Polyfluoroalkyl Substances (PFAS) and 1 metal.

The City of Ludington received official contact from US EPA regarding participation in early 2022.

Due to our current public water supply classification being a small system (size category 3,300 – 10,000 people served), participation in UCMR 5 is fully funded and covered in the federal government budget.

More information can be found at www.epa.gov

US EPA UCMR 5 Contaminant Monitoring List ***2023 - 2025***	**Reporting Level (RL)**
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.005 ppb
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	0.002 ppb
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.003 ppb
Hexafluoropropylene oxide dimer acid (HFPO DA)	0.005 ppb
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	0.02 ppb
Perfluorobutanoic acid (PFBA)	0.005 ppb
Perfluorobutanesulfonic acid (PFBS)	0.003 ppb
1H,1H, 2H, 2H-perfluorodecane sulfonic acid (8:2FTS)	0.005 ppb
Perfluorodecanoic acid (PFDA)	0.003 ppb
Perfluorododecanoic acid (PFDoA)	0.003 ppb
Perfluoro(2-ethoxyethane) sulfonic acid (PFEESA)	0.003 ppb
Perfluoroheptanesulfonic acid (PFHpS)	0.003 ppb
Perfluoroheptanoic acid (PFHpA)	0.003 ppb
1H,1H, 2H, 2H-perfluorohexane sulfonic acid (4:2FTS)	0.003 ppb
Perfluorohexanesulfonic acid (PFHxS)	0.003 ppb
Perfluorohexanoic acid (PFHxA)	0.003 ppb
Perfluoro-3-methoxypropanoic acid (PFMPA)	0.004 ppb
Perfluoro-4-methoxybutanoic acid (PFMBA)	0.003 ppb
Perfluorononanoic acid (PFNA)	0.004 ppb
1H,1H, 2H, 2H-perfluorooctane sulfonic acid (6:2FTS)	0.005 ppb
Perfluorooctanesulfonic acid (PFOS)	0.004 ppb
Perfluorooctanoic acid (PFOA)	0.004 ppb
Perfluoropentanoic acid (PFPeA)	0.003 ppb
Perfluoropentanesulfonic acid (PFPeS)	0.004 ppb
Perfluoroundecanoic acid (PFUnA)	0.002 ppb
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	0.005 ppb
N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.006 ppb
Perfluorotetradecanoic acid (PFTA)	0.008 ppb
Perfluorotridecanoic acid (PFTrDA)	0.007 ppb
Lithium	9 ppb

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EGLE DWEHD Cyanotoxin Monitoring

In 2021, EGLE and the Michigan Department of Health and Human Services (MDHHS) continued the voluntarily, state funded, public water system cyanotoxin monitoring program during the harmful algal bloom season. This monitoring program included analysis of source and treated water to determine public water system vulnerability during the timeframe in which harmful algal blooms (HAB) may occur (July – October). The City of Ludington elected to participate again in the monitoring program. Samples collected were analyzed by the MDHHS laboratory.

Table summarizing results of this monitoring program:

Collection Date	Contaminate	Reporting Level (RL)	Sample ID	Results
7/19/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
8/2/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
8/16/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
8/30/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
9/13/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
9/27/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
10/11/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	
10/25/2021	Total Microcystin	8.0 ppt	Source Water	ND (below RL)
			Treated Water	

For more information on HABs, call the US EPA Safe Drinking Water Hotline at 1-800-426-4791 or EGLE EAC at 1-800-662-9278. Additional information can be found at https://www.epa.gov/cyanohabs

Water Treatment Plant
501 N. Lakeshore Dr. Ludington, MI 49431
Jamie Hockemeyer (231) 843-8830

Fluoride

Fluoridation is performed at the water treatment plant for dental health purposes. The CDC has the following advice for parents of infants; "The proper amount of fluoride from infancy through old age helps prevent and control tooth decay. Recent evidence suggests that mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis may increase the chance of a child developing the faint white markings of very mild or mild enamel fluorosis. Parents should follow the advice of the formula manufacturer and their child's doctor for the type of water appropriate for the formula they are using. Parents and caregivers of infants fed primarily with formula from concentrate who are concerned about the effect that mixing their infant's formula with fluoridated water may have in developing enamel fluorosis can lessen this exposure by mixing formula with low fluoride water most or all of the time." For more information- https://www.cdc.gov/fluoridation/faqs/infant-formula.html

In 2015, the US Department of Health and Human Services (DHHS) determined 0.7 ppm (mg/L) of fluoride in water to be the optimal level. The City of Ludington has been awarded the CDC's Annual Water Fluoridation Quality Award for the last 12 years running due to consistently meeting this optimal level. The MDHHS Oral Health Program has also congratulated us for achieving this annual award.

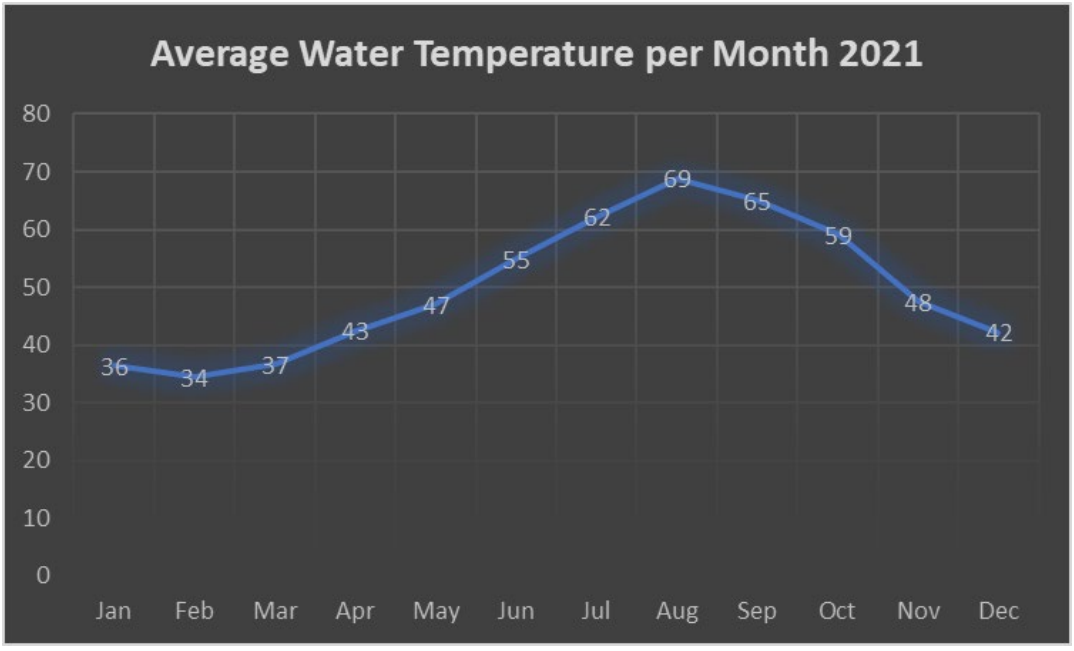
General Water Quality Parameters for 2021

Average Finished Water Total Hardness= 138 mg/L (as $CaCO_3$) or 8.1 grains per gallon

Average Finished Water Total Alkalinity= 111 mg/L (as $CaCO_3$)

Average Finished Water pH= 7.9

Average Monthly Source Water Temperature (°F) at the Intakes in Lake Michigan:



Taste and Odor

Aesthetic issues (taste, odor, discoloration) can sometimes be observed in drinking water. If you experience an abnormal situation and would like help determining the source of the issue or to have the water in your home tested, please contact Jamie Hockemeyer Water Treatment Plant Superintendent at (231) 843-8830.

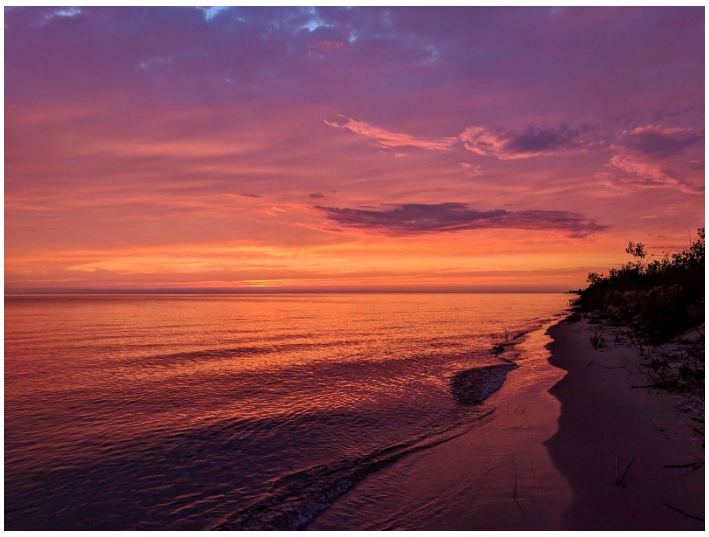
As the temperature of Lake Michigan increases above 65 degrees Fahrenheit during the mid to late summer months and decreases below 35 degrees Fahrenheit in late winter to early spring, you may experience sudden but short duration changes in the taste and odor of your drinking water. Water Treatment Plant operators use several treatment techniques to remove/reduce the chances of taste and odor issues. If you experience this situation, a common method to eliminate the issue is to flush water from all of your faucets (hot and cold) for 3-5 minutes.

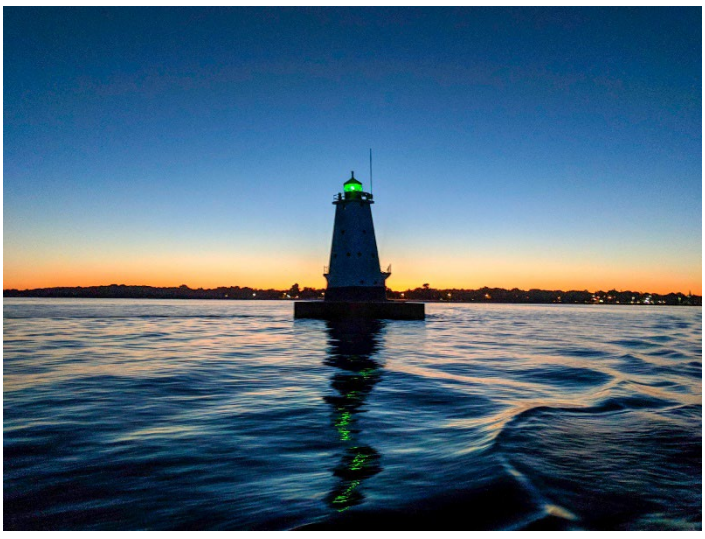
The Cross Connection Control Program

The Cross Connection Control Program is designed to protect the city's water supply from any unwanted flow from residential, commercial, or industrial customers. A cross-connection is a link or potential link between potable (safe) water and any source containing water or other substances that are not safe for human consumption. Utility Maintenance staff under DPW oversee inspection and testing of devices used to prevent cross connections throughout the community with the help of a qualified contractor as required by federal and state requirements.

Continuation of Water Service

In the event of a power outage, inclement weather, or natural disaster, the Ludington Water Treatment Plant and water distribution system is equipped to continue operation. This operation is due to the emergency standby generators at the plant, design of the system which utilizes several elevated storage tanks, updated standard operating procedures, and experienced operators.





Water Treatment Plant

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History of the Ludington Water Treatment Plant

The City of Ludington has been providing water from Lake Michigan to the public for well over 100 years!

Before 1970, water was pumped from Lake Michigan through a crib intake to the city and surrounding communities.

In 1970, a new conventional surface water treatment plant with clarifiers and filters, buried intake, low lift pump station, wash-water recovery tank, sludge lagoons, high service pump station, and storage reservoir were built. This marked a dramatic improvement in water quality and capacity.

In 1998, the water treatment plant was upgraded to include new treatment chemical storage and feed equipment, an emergency backup generator, and variable frequency drives in the low lift pump station. This marked improvement in operational capability, safety, and reliability.

During 2006-2007, improvements were made to the high service pumps and discharge piping to the distribution system. This marked improvement in pumping capacity and redundancy.

During 2016-2019, the water treatment plant was upgraded again. Flocculation basins and inclined plate settlers replaced the existing clarifiers. Two additional filters, a larger emergency backup generator, new high service pumps with variable frequency drives, new chemical storage, and updated feed equipment were all installed.

During 2020-2021, a focus on preventative maintenance involved overhauling of existing pumps and replacement of aging valve actuators. In addition, new water quality monitoring equipment for the laboratory and continuous process control for treatment stages which utilizes optical laser technology was installed. This technology allows for greater data accuracy and faster testing results which provides operators more information and better oversight.

This marked improvement in treatment of source water and increased the treatment capacity of the water plant as required by EGLE to meet our water demand by the City and surrounding communities.