Carp Well System

The following report summarizes the drinking water quality results, adverse water quality notifications, and other operating information related to the **Carp Well System** (waterworks# 210002272) for the period January 1 to December 31, 2020. It was prepared in accordance with Section 11 of O.Reg.170/03 under the Safe Drinking Water Act (SDWA, 2002).

The Annual Report for each municipal water system operated by the City of Ottawa is posted on the web site www.ottawa.ca. Copies of each Annual Report and Summary Report prepared in accordance with Schedule 22 of O.Reg.170/03, are available to the public at 951 Clyde Avenue (telephone 3-1-1), the Britannia Water Purification Plant (2731 Cassels Street), and the Lemieux Island Water Purification Plant (1 Onigam Street).

Description of Drinking Water System

The Carp Well System draws ground water from two wells located near the treatment plant. The source wells have consistently been found to be clear of bacteriological and chemical contaminants. The source water has a moderate level of hardness and a noticeable concentration of naturally occurring hydrogen sulfide.

The treatment process for the Carp Well System consists of the following steps:

- chlorine disinfection
- water storage
- high-lift pumping

The treatment process results in water that is clear and safe to drink although there is a noticeable sulphur taste that is of aesthetic concern to some customers.

Treated water is pumped through the distribution network with a free chlorine concentration maintained throughout the supply system. On-line analyzers are used to measure the chlorine residual and turbidity (cloudiness) of the treated water. Chlorine levels in the distribution system are also monitored continuously by a dedicated analyzer located at the Carp Arena. All treatment, pumping, and storage systems are controlled by a dedicated computer control system and monitored by certified Water Treatment

Operators 24 hours per day. A certified operator visits the well system twice per week to collect water samples and conduct on-site water quality tests.

The water treatment chemicals used are listed below:

- Sodium Hypochlorite (liquid – 6%)

Monetary expenses incurred during this reporting period

In order to maintain the safe and efficient operation of the waterworks, maintenance and capital projects are undertaken from time to time. All major repairs or upgrade projects that took place during the reporting period are described below.

Diesel Pump ($1,000,000): This project is designed to sustain water pressure in the distribution system in the event of a pump station failure, and is currently in its final construction phase. The project includes the installation of a diesel driven pump and fuel storage systems. The project is expected to be completed in 2021.

Granular Activated Carbon and Electrical Upgrades ($4,900,000): A project was initiated to provide carbon treatment of the Carp Well water to address aesthetic water quality issues. In addition, electrical upgrades will occur and include replacement of the motor control center and automated transfer switch. The project construction began in late 2018 and is expected to be completed in 2021.

Water Quality test results

The Ontario Drinking Water System Regulation O.Reg.170/03 defines water quality sampling and testing requirements in several categories: microbiological, operational, inorganic, and organic test parameters. The sections below describe the 2020 test results for samples required by O.Reg.170/03. In addition to the required tests, the City of Ottawa analyzes its drinking water for hundreds of other trace substances and test parameters in order to ensure the safety of the water supply. A complete table of water quality test results is posted on the City website www.ottawa.ca for each water system.

Microbiological

Total Coliform and E.coli bacteria tests are performed on the raw, treated and distributed drinking water. These types of bacteria are considered to be “indicator” organisms since they do not directly cause illness, but their presence indicates the potential for other pathogenic organisms to be present.

“Raw” water refers to untreated water drawn into the treatment plant from two wells. During 2020, Total Coliform bacteria were detected in 5 out of 104 samples taken from Well #1 and none were detected in samples taken from Well #2. None of the samples indicated the presence of E.coli bacteria. In the Carp wells have had some positives Total Coliform but no E. coli and in each case the Well was disinfected.

Treated water is tested as it leaves the plant and enters the distribution system. Routine samples are also taken within the distribution system (Carp Arena and West Carlton Lodge, Fire Hall) to verify water quality throughout the supply network. Due to the COVID-19 pandemic, in order to protect our staff and the public, the West Carton sample location was changed to the Fire Hall. During 2020, there were no (0) samples of Carp treated or distributed water that indicated the presence of Total Coliform bacteria or E.coli bacteria.

The treated and distribution water microbiological results for Total Coliform and E.coli bacteria are summarized in the table below.

Table 1a Summary of microbiological test results for Carp treated and distributed water during 2020

Parameter	Number of treated water samples taken	Number of positive test results	Number of distribution samples taken	Number of positive test results
Total coliform bacteria (cfu/100mL)	105	0	157	0

Parameter	Number of treated water samples taken	Number of positive test results	Number of distribution samples taken	Number of positive test results
E. coli bacteria (cfu/100mL)	105	0	157	0

cfu=colony forming units

HPC (heterotrophic plate count) bacteria represent a broad spectrum of environmental aerobic bacteria that indicate biological growth. They are not harmful to humans, and are therefore not considered to represent adverse drinking water quality. However, they are useful as operational indicators for the presence of biological (ie. biofilm) growth on the inside surface of a pipe or watermain. An operational limit of 500 (cfu/mL) has been established as a target for drinking water systems in Ontario. During 2020, there was 1 out of 156 distribution samples and no samples of treated water that exceeded the operational target.

The treated and distribution water microbiological results for HPC bacteria are summarized in the table below.

Table 1b Summary of the heterotrophic plate count (HPC) bacteria test results for Carp treated and distribution samples taken during 2020.

Parameter	Number of treated water samples taken	Range of test results	Number of distribution samples taken	Range of test results
HPC bacteria (cfu/mL)	105	0	156	0 – >3000

cfu=colony forming units

Operational: Operational tests are conducted by certified operators to evaluate water quality and to make adjustments to the treatment process. For the Carp Well System, continuous on-line analyzers are used to measure and record important process parameters such as chlorine concentration and turbidity. In addition, a certified Operator visits the site twice per week to conduct routine operational tests using laboratory or portable instruments to verify water quality. The 2020 test results for turbidity and chlorine are summarized in the table below. During 2020, all operational tests of treated water complied with safe drinking water standards.

Table 2 Summary of operational testing performed for Carp treated water during 2020

Parameter	Average value	Range of values (min - max)	Number of samples
Turbidity	0.70 NTU	0.49 – 0.99 NTU	107
Total Chlorine	0.98 mg/L	0.65 – 1.32 mg/L	105

Inorganics: Inorganic substances include heavy metals and dissolved minerals that may be present in treated drinking water and are tested monthly including the individual source wells. The table below summarizes the 2020 test results, expressed as annual average concentrations in mg/L All inorganic test results during 2020 were safely within the Maximum Acceptable Concentration (MAC) as per Ontario Drinking Water Standards. The MAC concentrations for drinking water are listed in the right column for reference.

Table 3 Summary of inorganic test results for Carp treated water during 2020

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
Antimony	mg/L	0	0.006
Arsenic	mg/L	0	0.010
Barium	mg/L	0.31	1
Boron	mg/L	0.17	5
Cadmium	mg/L	0	0.005
Chromium	mg/L	0.0001	0.05
Lead	mg/L	0	0.01
Mercury	mg/L	0	0.001
Selenium	mg/L	0	0.05
Uranium	mg/L	0	0.02
Sodium	mg/L	58.5	20*
Fluoride	mg/L	0.55	1.5

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
Nitrate	mg/L	0	10
Nitrite	mg/L	0	1

0 denotes that the chemical was not detected.

NOTE*: Sodium health advisory level of 20 mg/L for people on sodium-restricted diets only.

Sodium occurs naturally in groundwater and is present in the Carp treated water at a concentration of 58.5 mg/L, which is above the health advisory limit of 20 mg/L for people on sodium-restricted diets. Notification of the sodium level exceedance was made to the Ministry (MECP) and Ottawa Public Health on May 2, 2017 for this water system (notification is required every 5 years).

Organics: Trace organic substances include: volatile organic compounds, pesticides, herbicides, industrial solvents, and disinfection by-products. Trace organics are tested annually in the treated water and individual source wells. The table below shows the 2020 test for the treated water. None of the trace organic substances were detected with the exception of Trihalomethanes (THM) and Haloacetic Acids (HAA), which are tested monthly to monitor seasonal trends. THMs and HAAs are organic compounds that form during the treatment process when chlorine reacts with natural organic matter dissolved in the water. All trace organic test results during 2020 were safely within the Maximum Acceptable Concentration (MAC) as per Ontario Drinking Water Standards. The MAC concentrations for drinking water are listed in the right column for reference.

Table 4 Summary of trace organic test results for Carp treated water during 2020

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
Alachlor	mg/L	0	0.005
Atrazine + N-dealkylated metabolites	mg/L	0	0.005
Azinphos-methyl	mg/L	0	0.02
Benzene	mg/L	0	0.001
Benzo(a)pyrene	mg/L	0	0.00001
Bromoxynil	mg/L	0	0.005
Carbaryl	mg/L	0	0.09
Carbofuran	mg/L	0	0.09
Carbon Tetrachloride	mg/L	0	0.002
Chlorpyrifos	mg/L	0	0.09
Diazinon	mg/L	0	0.02
Dicamba	mg/L	0	0.12

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
1,2-Dichlorobenzene	mg/L	0	0.2
1,4-Dichlorobenzene	mg/L	0	0.005
1,2-Dichloroethane	mg/L	0	0.005
1,1-Dichloroethylene	mg/L	0	0.014
Dichloromethane	mg/L	0	0.05
2-4 Dichlorophenol	mg/L	0	0.9
2,4-Dichlorophenoxy acetic acid (2,4D)	mg/L	0	0.1
Diclofop-methyl	mg/L	0	0.009
Dimethoate	mg/L	0	0.02
Diquat	mg/L	0	0.07
Diuron	mg/L	0	0.15
Glyphosate	mg/L	0	0.28
Haloacetic Acids*	mg/L	0.017	0.080

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
Malathion	mg/L	0	0.19
2-Methyl-4-chlorophenoxyacetic Acid (MCPA)	mg/L	0	0.10
Metolachlor	mg/L	0	0.05
Metribuzin	mg/L	0	0.08
Monochlorobenzene	mg/L	0	0.08
Paraquat	mg/L	0	0.007
Pentachlorophenol	mg/L	0	0.06
Phorate	mg/L	0	0.002
Picloram	mg/L	0	0.19
Polychlorinated Biphenyls (PCB)	mg/L	0	0.003
Prometryne	mg/L	0	0.001
Simazine	mg/L	0	0.01

Parameter	Unit of Measure	Result	Ontario Drinking Water Standard (MAC)
Terbufos	mg/L	0	0.001
Tetrachloroethylene	mg/L	0	0.01
2,3,4,6-Tetrachlorophenol	mg/L	0	0.1
Triallate	mg/L	0	0.23
Trichloroethylene	mg/L	0	0.005
2,4,6-Trichlorophenol	mg/L	0	0.005
Trifluralin	mg/L	0	0.045
Trihalomethanes*	mg/L	0.053	0.1
Vinyl Chloride	mg/L	0	0.001

0 denotes that the chemical was not detected.

NOTE*: The reported Trihalomethane (THM) and Haloacetic acid (HAA) results represent the average concentration measured in the distribution system.

Adverse Water Quality Incidents (AWQI) Requiring Notification

The drinking water regulations identify several “Indicators of Adverse Water Quality” for which the waterworks must immediately notify health officials and the Ministry of the Environment, Conservation and Parks (MECP). These refer to any sample of treated or

distributed drinking water that does not meet a provincial water quality standard or a situation where disinfection of the water may be compromised. For each Adverse Water Quality Incident (AWQI), City of Ottawa staff immediately notified Ottawa Public Health Department and the Ministry of the Environment, Conservation and Parks (MECP) as required by regulations. Corrective actions, re-sampling, and reporting are required in each case.

During 2020, there were no (0) AWQI events for the Carp Well System.

Community Lead Testing Program

The treated water produced by the Carp Well System is lead-free. However, trace amounts of lead can potentially be dissolved in the water as it comes in contact with household plumbing components such as lead solder and brass fittings. The current Ontario standard for lead in drinking water is 10 ppb (parts per billion), expressed as a Maximum Acceptable Concentration (MAC) measured at the customer's tap. During 2019, Health Canada lowered the acceptable concentration to 5 ppb for lead in drinking water, due to increasing concerns for adverse health effects in children. To date, the Ontario standard for lead has not yet been revised to align with the new Health Canada guideline.

In July 2007, a new provincial regulation (amendment to O.Reg.170/03) was initiated in response to concerns about potential lead levels in provincial water supplies. The Community Lead Testing Program requires each water system to test tap water lead levels in representative homes during both winter and summer conditions. Ottawa's test results have consistently passed the Provincial lead testing criteria for drinking water. In order to meet compliance standards, 90% of the tap water samples must have a lead concentration below 10 ppb (parts per billion) following a 30-minute period of stagnation in the plumbing system.

Since the initial rounds of testing indicated the absence of lead in tap water taken from customer homes, the Carp Well System was granted relief from residential lead sampling. However, distribution system samples must be tested every winter and summer for alkalinity and pH, and lead is tested every three years. During 2020, distribution system samples were tested for alkalinity and pH during the winter and summer sampling period.

Summary

The results demonstrate that the quality of drinking water treated and distributed from the Carp Well System remained high during 2020 and met all Ontario Drinking Water Standards.

If you have any questions or concerns regarding the quality of your drinking water, please contact the City of Ottawa at 3-1-1 or email at info-water@ottawa.ca.

For more information on the City of Ottawa drinking water, please visit our website at www.ottawa.ca.