



Dale and Kathy Kirkpatrick  
7645 Settlers Way  
North Gower, ON  
K0A 2T0

August 30, 2024

**Re: Results of chemical and bacteriological analysis of your well water  
(West Ottawa Groundwater Study Sample No. 22-AG-218)**

Dear Dale and Kathy Kirkpatrick,

Thank you for participating in the West Ottawa Groundwater Study. During the summer of 2022, your **untreated (raw) well water** was sampled as part of this study for a number of parameters, including bacteria, chemicals, and mineral compounds. The results from your well will help provide a better understanding of the groundwater in Eastern Ontario. We would like to remind you that the purpose of the well water testing was for a scientific study and should not be considered a drinking water testing service. You may want to arrange for testing of your well water by an accredited laboratory or review current well water treatment options depending on your results.

The attached table in your information package provides the results of the chemical and bacteriological analysis of your raw well water sample that was collected during the summer of 2022. You will recall that we shared the bacteriological results with you in December 2022. We apologize for providing the remaining analytical results well beyond the date that we had expected, there were significant unforeseen setbacks and complications at the Ontario Geological Survey laboratory that analyses about 75% of the parameters for this project. The South Ottawa Groundwater Study has prioritized maintaining a high level of data quality and, as such we opted to wait for the laboratory issues to be fully resolved before providing your results.

The attached table shows results for 73 parameters, as well as information on:

- (1) Ontario Drinking Water Standard or Canadian Drinking Water Guideline, where one exists;
- and (2) The most typical value for all well waters in the study area.

The chemistry of groundwater varies widely in the study area and is dependent on factors that include the local geology, the composition of the rock and soil underground, the depth and construction of the well, groundwater flow patterns and near-by land uses. Occasionally, contamination occurs due to human activity. The presence of naturally occurring minerals and other dissolved chemicals should not be considered unexpected or undesirable by itself. Many of these naturally-occurring compounds are important minerals and nutrients required by humans, animals, and plants. However, the amount of some chemicals in raw water may be undesirable

for health or aesthetic reasons.

#### Interpreting your results:

The levels of some compounds in your well water may be above the Ontario Drinking Water Standard or Canadian Drinking Water Guideline (health or aesthetic objective). **These drinking water standards and guidelines may not be applicable if you are not using the water as a drinking water source or have an effective and appropriate water treatment system in place.** If you are unsure about your treatment options, consult with a water treatment professional.

Please note that the City of Ottawa is not responsible for the quality of drinking water from private (non-municipal) services. You may want to arrange for testing of your well water by an accredited laboratory. A list of laboratories licensed to perform drinking water tests in Ontario is available at: <https://www.ontario.ca/page/list-licensed-laboratories>. The laboratory can provide you with a sample bottle and instructions on how to take a sample. Ensure you follow up with the lab to obtain your results.

#### Additional Information About Your Untreated Well Water:

Note that Gross Alpha and Gross Beta are federal screening levels only. For more information, please visit: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-radiological-parameters.html>

In general, Gross Alpha and Gross Beta levels are measured to screen for the broad range of radiological parameters present in the water. Well water that exceeds the limits of Gross Alpha and/or Gross Beta is not necessarily hazardous to health but could identify if additional testing is needed. The nature of any additional testing would be based on the chemical characteristics of your specific well water. If you are concerned about Gross Alpha/Gross Beta levels reported in your well water, please contact the West Ottawa Groundwater Study phone line (613-580-2424 x39355) and staff can direct you to the appropriate contact for advice.

#### Aesthetic-Related Exceedances:

The results of the chemical analysis of your untreated well water showed some aesthetic-related exceedances that can affect the taste, colour or smell of your water. You may be treating your water already, or want to consider treating it in the future to make it more palatable for drinking or maintaining your plumbing system. These parameters may include pH, Total Dissolved Solids, Hardness, Dissolved Organic Carbon, Sodium, Sulphate, Chloride, Organic Nitrogen, Iron, Manganese, and methane. For your information, we included a summary sheet about common aesthetic exceedances that were identified in Eastern Ontario (2 pages). For more information, you can download the publication, "*Technical Support Document for Ontario Drinking Water Standards, Objective and Guidelines*", available online from the Ontario Ministry of the Environment and Climate Change:

[www.ene.gov.on.ca/environment/en/resources/](http://www.ene.gov.on.ca/environment/en/resources/) .



## RECOMMENDATIONS:

- 1) Please contact the Wells Help Desk (<https://www.ontario.ca/page/wells-your-property>) operated by the Ontario Ministry of the Environment, Conservation and Parks (MECP) if you need assistance interpreting your results, or assistance with well water treatment options or help locating your well record.

### How to contact the Wells Help Desk:

Phone: Toll-free: 1-888-396-9355

Email: [wellshelpdesk@ontario.ca](mailto:wellshelpdesk@ontario.ca)

- 2) If you are currently treating your well drinking water, you may want to consult with a water treatment specialist to discuss any modifications that should be considered, especially if a health-related parameter exceeds the Ontario Drinking Water Standards or Canadian Drinking Water Guideline.
- 3) All private drinking water wells should be tested for bacteriological exceedances at least two times a year, as well as after major plumbing work is done in your home, to ensure your drinking water is safe.

The Public Health Ontario Laboratory provides bacteria water testing of private well water (Total Coliforms and *E. coli*) free of charge. To obtain free bacteriological drinking water testing, specific water sample bottles are required. They can be obtained from your local health unit. To find out the closest or most convenient water bottle pick up and drop off locations, please refer to your local Health Unit webpage.

Ottawa Public Health: [www.ottawapublichealth.ca/wellwater](http://www.ottawapublichealth.ca/wellwater)

Leeds, Grenville & Lanark District Health Unit: [www.healthunit.org](http://www.healthunit.org)

Thank you for being part of this study. Your assistance has made an important contribution to the understanding of groundwater in Eastern Ontario. For more information about the South Ottawa Groundwater Study, please visit [www.Ottawa.ca/WellWaterStudy](http://www.Ottawa.ca/WellWaterStudy). Please feel free to contact us if you have any questions.

Yours sincerely,



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## Ambient Groundwater Sample No. 22-AG-218

Parameter	Formula	Measurement Units	Your Well Water Concentration	Most Typical Measurement	Ontario Drinking Water Standard
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### Geological Unit

Geological source of well water (interpreted):	Bedrock
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### Field & Bulk Parameters

Temperature	-	°C	9.1	9.9	(15)
pH	pH	pH units	6.89	7.16	(>6.5 - <8.5)
Electrical Conductivity	E.C.	µS/cm	946.9	845.9	
Oxidation-Reduction Potential	Eh <sub>+200</sub>	mV	-75.1	-70	
Total Dissolved Solids	TDS	mg/L	748	630.5	(500)
Hardness (for mg/L multiply by 17.1)	-	grains per US gal	25.3	20.2	(29 (500 mg/L))
Dissolved Organic Carbon	DOC	mg/L	2.3	1.4	(5)
Dissolved Inorganic Carbon	DIC	mg/L	84.4	63.7	

### Bacteriological Parameters

Total Coliforms	-	counts/100 ml	<1	<1	0
Fecal Coliforms	-	counts/100 ml	<1	<1	0

### Dissolved Gases

Dissolved Oxygen	O <sub>2</sub>	% Saturation	0	0	
Hydrogen Sulphide*	H <sub>2</sub> S	mg/L	0.02	0.01	
Methane**	CH <sub>4</sub>	L/m <sup>3</sup>	0	0	(3 L/m <sup>3</sup> )**

### Major Constituents

Calcium	Ca <sup>2+</sup>	mg/L	99	82	
Magnesium	Mg <sup>2+</sup>	mg/L	45	35	
Sodium	Na <sup>+</sup>	mg/L	44	41	(200)
Potassium	K <sup>+</sup>	mg/L	2.6	4	
Bicarbonate	HCO <sub>3</sub> <sup>-</sup>	mg/L	422	317	
Sulphate	SO <sub>4</sub> <sup>2-</sup>	mg/L	28	9.9	(500)
Chloride	Cl <sup>-</sup>	mg/L	91	72	(250)
Bromide	Br <sup>-</sup>	mg/L	0.06	0.08	
Fluoride	F <sup>-</sup>	mg/L	0.23	0.26	1.5
Iodide	I <sup>-</sup>	µg/L	9	7	
Nitrate	NO <sub>3</sub> <sup>-</sup>	mg/L (as N)	<0.02	<0.005	10
Nitrite	NO <sub>2</sub> <sup>-</sup>	mg/L (as N)	<0.02	<0.006	1
Ammonia	NH <sub>3</sub>	mg/L (as N)	0.15	0.06	
Iron	Fe	mg/L	1.17	0.13	(0.3)
Strontium	Sr <sup>2+</sup>	mg/L	0.205	0.92	
Silicon	Si	mg/L	4.2	5.4	

### Trace Constituents

Aluminum	Al	µg/L	<10	<10	(100)
Antimony	Sb	µg/L	<9	<9	6
Arsenic	As	µg/L	<2	<2	10
Barium	Ba	µg/L	846	124	1000
Boron	B	µg/L	25	70	5000
Cadmium	Cd	µg/L	<0.03	<0.03	5
Cesium	Cs	µg/L	<1	<1	
Chromium	Cr	µg/L	<0.8	<0.8	50
Cobalt	Co	µg/L	-	0.016	
Copper	Cu	µg/L	<3	<3	(1000)
Dysprosium	Dy	µg/L	<0.1	<0.1	
Erbium	Er	µg/L	<0.1	<0.1	
Europium	Eu	µg/L	0.1	<0.1	
Gadolinium	Gd	µg/L	<0.1	<0.1	
Gold	Au	µg/L	<0.1	<0.1	
Holmium	Ho	µg/L	<0.1	<0.1	



## Ambient Groundwater Sample No.

22-AG-218

(continued)

Parameter	Formula	Measurement Units	Your Well Water Concentration	Most Typical Measurement	Ontario Drinking Water Standard
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## Trace Constituents (continued)

Lanthanum	La	µg/L	<0.1	<0.1	
Lead	Pb	µg/L	<0.9	<0.9	10
Lithium	Li	µg/L	3	7	
Lutetium	Lu	µg/L	<1	<1	
Manganese	Mn	µg/L	14	10	(50)
Mercury	Hg	ng/L	<1.5	<1.5	1000
Molybdenum	Mo	µg/L	<4	<4	
Praseodymium	Pr	µg/L	<0.1	<0.1	
Rubidium	Rb	µg/L	3	4	
Samarium	Sm	µg/L	<0.1	<0.1	
Selenium	Se	µg/L	<0.4	<0.4	50
Silver	Ag	µg/L	<0.5	<0.5	
Tantalum	Ta	µg/L	<1	<1	
Terbium	Tb	µg/L	<0.1	<0.1	
Thallium	Tl	µg/L	-	<0.005	
Thulium	Tm	µg/L	<0.1	<0.1	
Tin	Sn	µg/L	<0.6	<0.6	
Titanium	Ti	µg/L	-	<0.1	
Tungsten	W	µg/L	<2	<2	
Uranium	U	µg/L	1.1	0.70	20
Vanadium	V	µg/L	<0.1	0.06	
Ytterbium	Yb	µg/L	<0.1	<0.1	
Yttrium	Y	µg/L	-	0.02	
Zinc	Zn	µg/L	3	1.8	(5000)
Zirconium	Zr	µg/L	<20	<20	

## Radiological Parameters

Gross alpha	α	Bq/L	0.7	<0.25	0.5***
Gross beta	β	Bq/L	0.5	0.3	1***
Radon 222	Rn-222	Bq/L	15	8	2000****

\* In well water, hydrogen sulphide is commonly referred to as 'sulphur'

\*\* The ODWS L/m<sup>3</sup> units are for total gas (dissolved + free-gas). Our techniques do not fully capture the free gas phase, therefore actual methane concentration may be higher.

\*\*\*Gross α and β are screening levels established by the World Health Organization

\*\*\*\* Radon standard is a recommended action limit from the Guidelines for Canadian Drinking Water Quality not an ODWS

"Analysis was diluted and result may be underestimated. Bacteria values with the suffix 'UAL' are approximate because the maximum sample transport time to the laboratory was exceeded

Although the Ambient Groundwater Geochemistry Study is not a drinking water testing service, the Ontario Drinking Water Standards (ODWS) are provided in the table above to help well owners understand their results in the context of provincial regulations. The ODWS are applied to municipal drinking water systems operators, who are required by law to meet the health-related standards. Owners of private wells are under no obligation to meet these standards but would be wise to consider treatment to remediate any health-related exceedances if the water is used for drinking. The standards listed in parentheses are not health-related and are either aesthetic objectives or operational guidelines. Aesthetic objectives may affect taste or cause fouling of fixtures, etc. Operational guidelines indicate levels that may cause problems with some types of water treatment. For further information, see the publication "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", available at: <https://www.ontario.ca/laws/regulation/030169> (or Google "ODWS standards"). The standards for the radiological parameters can be found at <https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-radiological-parameters.html>

"Most typical measurement", also called the median, is the very middle of all the concentrations obtained for all the waters tested in the study. Half of all the samples have lower concentrations than the median and half higher for each particular parameter. The median can be thought of as the "average" concentration but is better than a true average because it will not be biased by several very high numbers.

Please note that the sampling and testing of waters as part of the Ambient Groundwater Geochemistry Mapping Program are carried out for the purpose of delineating the natural chemistry of groundwater across the province. This report is provided for the well owner's information only. The laboratories that conducted the analyses are accredited for the testing of the various parameters reported herein but are not necessarily licensed under the regulations that govern the testing of municipal and distributed water systems. Therefore, these results cannot be used to fulfil the regulatory requirements for such systems.

Not all parameters were analyzed within recommended holding times. While the data passed routine quality control checks, analysis following expiration of recommended holding times may not accurately reflect the true concentration of the analytes.

mg/L = milligrams per litre (parts per million)  
µg/L = micrograms per litre (parts per billion)  
ng/L = nanograms per litre (parts per trillion)  
<, > = less than / greater than  
A hyphen, "-" means there is no result available

## Drinking Water Quality Standards, Objectives and Guidelines

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The following information has been summarized from the Ontario Ministry of the Environment: *Drinking Water Standards, Objectives and Guidelines* (MOE, 2006) and the *Guidelines for Canadian Drinking Water Quality* (Health Canada, 2012).

### pH:

pH is a parameter that indicates the acidity of a water sample. Drinking water minimum and maximum pH is 6.5 and 8.5, for aesthetic reasons. Low pH can cause corrosion of water pipes, while high pH can cause encrustation (build-up) on pipes and a bitter taste.

### Total Dissolved Solids (TDS):

Total Dissolved Solids (TDS) represents the dissolved substances in water. The aesthetic drinking water objective for TDS is 500 mg/L; excessive hardness, poor taste, mineral build-up or corrosion of pipes are common for water with TDS greater than 500 mg/L.

### Hardness:

The operational guideline is set between 80 – 100 mg/L as calcium carbonate ( $\text{CaCO}_3$ ). Hard water produces encrustation (build-up) on pipes, tubs, sinks, utensils, and can cause excessive soap scum with regular soaps. Soft water may result in corrosion of water pipes. Hardness levels between 80 to 100 mg/L are considered to be a good balance between corrosion and encrustation. The aesthetic objective for hardness is 500 mg/L (or 29 grains/US gal), with poor taste above that level.

Typical hardness levels:

- Soft 0 – 75 mg/L as  $\text{CaCO}_3$  (0 – 4.4 grains per US gallon)
- Optimal 76 – 100 mg/L as  $\text{CaCO}_3$  (4.5 – 5.8 grains per US gallon)
- Hard 101 – 300 mg/L as  $\text{CaCO}_3$  (5.9 – 17.5 grains per US gallon)
- Very Hard greater than 300 mg/L as  $\text{CaCO}_3$  (greater than 17.5 grains per US gallon)

### Dissolved Organic Carbon (DOC):

Dissolved Organic Carbon (DOC) is a measure of the organic material dissolved in water, generally from the decomposition of plant or animal material, and is naturally present in soil and water bodies. The aesthetic drinking water objective for DOC is 5 mg/L. DOC levels greater than 5 mg/L may complicate water treatment. High DOC can also impart a colour on water.

### Sulphide (as Hydrogen Sulphide):

The odour related aesthetic objective for sulphide in drinking water is 0.05 mg/L as hydrogen sulphide. High levels of hydrogen sulphide are associated with an unpleasant odour (rotten eggs) and taste. When sulphide is found with iron, it can produce black stains on laundry and black deposits on pipes and fixtures.



**Methane:**

The aesthetic objective for methane is 3 L/m<sup>3</sup> due to gas bubble release and violent spurting from taps, which can cause problems with the operation of the well pump and water distribution system. Methane occurs naturally in some groundwater and can increase microbiological fouling in water pipes. The potential for explosive combustion exists if methane is allowed to accumulate in confined areas.

**Sodium:**

The aesthetic drinking water objective is 200 mg/L at which it can be detected by a salty taste. Sodium is an essential nutrient for nerve impulses. The health-related warning level for people on sodium-restricted diets is 20 mg/L; levels above 20 mg/L can create the potential for cardiovascular problems for people at risk. Conventional water softeners increase the sodium content of water (by replacing calcium with sodium), so drinking water should bypass water softeners for people on sodium-restricted diets. Major sources of high sodium are water softeners, road salt and natural sources (geology).

**Chloride:**

The aesthetic drinking water objective of chloride is 250 mg/L. A salty taste and noticeable odour can be detected at levels above 250 mg/L. The normal range in drinking water is 5 – 20 mg/L. High chloride levels can make water more corrosive. Major sources are natural salt in the aquifer, road salts and septic systems.

**Organic Nitrogen:**

The operational guideline for organic nitrogen in drinking water is 0.15 mg/L. Taste and odour problems are common with organic nitrogen levels greater than 0.15 mg/L. In addition, organic nitrogen can react with chlorine and reduce its disinfectant power.

**Iron:**

The aesthetic drinking water objective for iron is 0.3 mg/L. It is an essential human nutrient for enzyme function and hemoglobin (blood). High levels of iron in water supplies may cause brownish staining on laundry, plumbing fixtures and the water itself. High levels of iron can cause an unpleasant bitter taste. Iron precipitate can promote the growth of bacteria in water pipes. Major sources of iron are geology, industrial sources, and corrosion of man-made iron and steel.

**Manganese:**

The aesthetic drinking water objective is 0.05 mg/L (or 50 µg/L). High levels of manganese in water supplies can stain plumbing fixtures and laundry, cause poor taste in beverages, form black build-up on pipes and cause black precipitate. Major sources are soils, sediments and geological formations, as well as industrial and agricultural run-off.

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**NOTE:** Aesthetic objectives relate to characteristics of drinking water that do not affect human health. They typically relate to the taste, smell, or look of the water, or a tendency to build up scale, or stain clothing or plumbing fixtures.