


Hamilton Rural Well Water Quality Report 2017



In this report you will find information on:

How to test the quality of your well water to make sure it is safe to drink

Health related concerns with well water in Hamilton, including bacteria and other chemicals of concern

How to maintain your well and prevent contamination of your water

A list of well water information resources



Hamilton
Public Health Services

This report is for people who use a private residential well or cistern for their water supply.

This report does not apply to drinking water systems regulated under the Safe Drinking Water Act or Health Protection and Promotion Act.

These include all municipal residential drinking water systems and all non-municipal drinking water systems (schools, daycare centres, group homes, mobile home/trailer parks, restaurants, arenas, churches, etc). These systems are regularly monitored.

Drinking water quality reports for municipal drinking water systems are available from Hamilton Public Works at **www.hamilton.ca/water**. Reports for non-municipal drinking water systems are available from the owners of these water systems.

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Introduction

As rural residents who rely on private wells for drinking and household use you are individual stewards of your common groundwater resource.

You should be aware how to test the quality of your well water to make sure it is safe to drink. You should know how to maintain your well and prevent contamination of your well water.

This 2nd Edition of the Hamilton Rural Well Water Quality Report, builds on the data from the first report, published in 2012.

This report contains information about Hamilton rural well water bacteria and chemical data, areas that are affected and recommendations on steps to take to make sure your water is safe. This report also contains information on how to test your well water, and how to understand your well water test results.

A new section on Drinking Water Source Protection and who may be affected by Source Protection Plans has been included. If you have an old well on your property that is no longer being used, you will find useful information.

Sodium in drinking water appears to be an emerging issue in Hamilton's wells. More information on sodium can be found in the Sodium Fact Sheet on page 16.

Contact Hamilton Public Health Services Safe Water Infoline at 905-546-2189 if you have any questions.

What's in your Well Water?

Public Health Services recommends you consider the following tests:

- Bacterial
- Chemical

Bacterial testing can find certain types of microbes (germs) called 'indicators'. These indicators include **Total coliform** and **E. coli**.

Total coliform are a group of bacteria found in animal wastes, surface soils and vegetation. E. coli are group of bacteria found in animal or human sewage contamination and can come from a nearby source, for example septic systems.

If these bacteria are found in your well water, it is a sign of poor water quality and a warning that steps must be taken to protect your drinking water source (well or cistern) from further contamination.

Chemical testing looks for elements that may be in rural drinking water. They may be in the underlying bedrock in the area (examples: arsenic, lead) or come from human sources (example: nitrates).

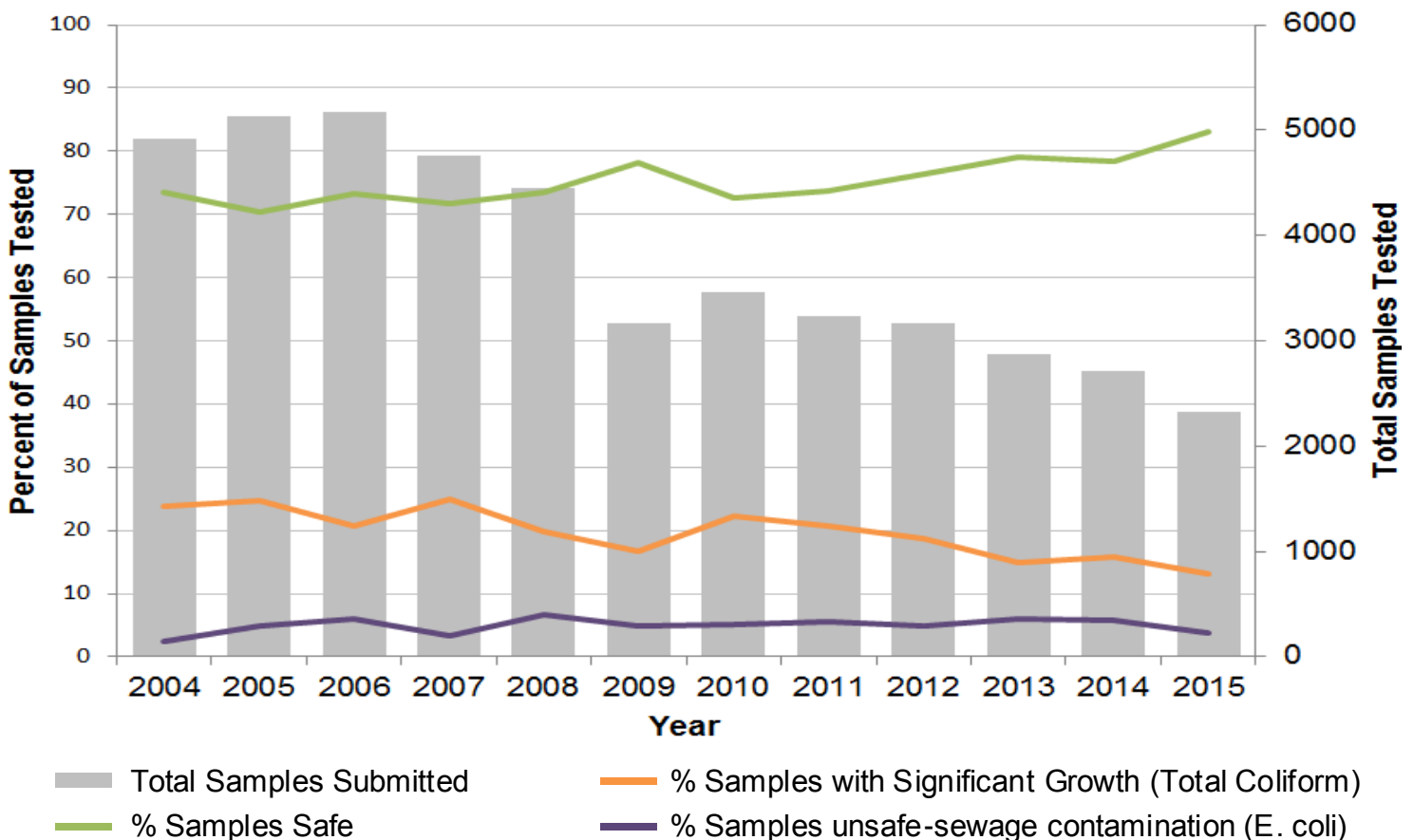


Hamilton Rural Well Water Bacteria Test Results

Since 2004, annual private well test results have been tracked to monitor rural water quality trends in Hamilton (see figure below). Overall, microbial test results have been improving over the past 12 years, with 83 per cent of samples being safe in 2015 compared to 74 per cent in 2004.

However, it is important to note that there have been fewer water samples being submitted by rural Hamilton residents. In 2015, there were about 2300 samples submitted, which is less than half the number of submissions in 2004.

Hamilton Private Well Bacterial Test Results (2004 - 2015)



Data Sourced From: Ministry of Health and Long-Term Care Public Health Laboratories

If you have not tested your well or cistern water for over a year, it is recommended that you test your drinking water right away.

Follow These Steps to Test your Well Water:

1. Pick up a testing kit

- Pick-up and drop-off locations are conveniently located throughout the City of Hamilton. A list can be found on page 6.
- Municipal Service Centres are open Monday to Friday 8:30 am to 4:30 pm. Samples can be dropped off Mondays to Thursdays at these centres.
- The Public Health Laboratory is open Monday to Friday 8:30 am to 4 pm. Samples can be dropped off at the lab Mondays to Fridays.
- Hours for additional pick-up locations vary. Please note: you cannot drop off samples at community pick-up locations as they do not have the refrigerated facilities to store samples.

2. Collect a water sample

- Use the sterile sample bottle provided by the Public Health Laboratory to collect a water sample. Follow the instructions that come with the bottle closely for accurate results.

3. Drop off the sample

- Bring your water sample to one of the locations that accepts drop-offs within 12 hours of collecting it from your well. Keep the water sample cool while you bring it in for testing. Sample freshness is essential for accurate results.
- Complete the form provided in the test kit so results can be mailed to you. Write down the number below the bar code on the bottle so you can call in to get test results later.
- The Public Health Lab cannot accept or test water samples from untreated surface water such as lakes, streams and ponds.

4. Wait for water test results

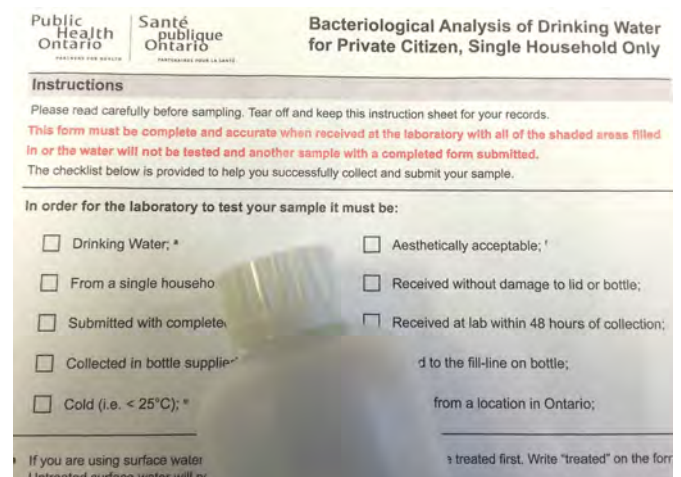
- You will get your well water test results by mail if you completed the form in the testing kit or you can follow instructions on the blue card enclosed with your testing kit to get test results from the automated telephone system.

When to test

Begin your testing program by collecting one water sample a week for three weeks.

If you have water treatment devices attached to your plumbing, such as a water softener or disinfection equipment, you should submit two drinking water samples; one from a tap/faucet used for drinking water and the other sample from a raw water source (before any treatment systems). This will tell you the level of bacteria in your tap water and in your well.

After your first testing, it is recommended that you test your well water at least three times a year. The best times are after spring melt, in mid-summer and in the fall when the quality of your well water can be different throughout the year, especially during periods of heavy rainfall or snowmelt.



The image shows a form titled "Bacteriological Analysis of Drinking Water for Private Citizen, Single Household Only". It includes logos for Public Health Ontario and Santé publique Ontario. The form contains instructions for sampling and a checklist of requirements for the laboratory to test the sample. The checklist items are: Drinking Water; Aesthetically acceptable; From a single household; Received without damage to lid or bottle; Submitted with complete form; Received at lab within 48 hours of collection; Collected in bottle supplied by the laboratory; Cold (i.e. < 25°C); and a note about untreated surface water.

Public Health Ontario | **Santé publique Ontario**
Bacteriological Analysis of Drinking Water for Private Citizen, Single Household Only

Instructions
Please read carefully before sampling. Tear off and keep this instruction sheet for your records.
This form must be complete and accurate when received at the laboratory with all of the shaded areas filled in or the water will not be tested and another sample with a completed form submitted.
The checklist below is provided to help you successfully collect and submit your sample.

In order for the laboratory to test your sample it must be:

<input type="checkbox"/> Drinking Water; *	<input type="checkbox"/> Aesthetically acceptable; †
<input type="checkbox"/> From a single household	<input type="checkbox"/> Received without damage to lid or bottle;
<input type="checkbox"/> Submitted with complete form	<input type="checkbox"/> Received at lab within 48 hours of collection;
<input type="checkbox"/> Collected in bottle supplied by the laboratory;	<input type="checkbox"/> Cold to the fill-line on bottle;
<input type="checkbox"/> Cold (i.e. < 25°C); *	<input type="checkbox"/> from a location in Ontario;

* If you are using surface water (lakes, streams, ponds, etc.) that has not been treated first, write "treated" on the form. Untreated surface water will not be tested.

Water Test Kit Pick-up and Drop-off Locations

Area	Location	Bottle Pick-Up	Sample Drop-Off
Ancaster	Municipal Service Centre 300 Wilson Street East	✓	✓
	Copetown General Store 2012 Governors Road	✓	
Dundas	Municipal Service Centre 60 Main Street	✓	✓
Flamborough	Municipal Service Centre 163 Dundas Street East, Waterdown	✓	✓
	97 General Store 1817 Regional Road 97, Valens	✓	
	Carlisle Post Office Centre Road	✓	
	Rockton Berry Farm 621 Highway 8	✓	
	Lynden Post Office 94 Lynden Road	✓	
Glanbrook	Municipal Service Centre 4280 Binbrook Road	✓	✓
Hamilton	Public Health Lab 250 Fennell Avenue West	✓	✓
	Hamilton City Hall 71 Main Street West	✓	✓
Stoney Creek	Municipal Service Centre 777 Highway 8	✓	✓
	Highland Country markets 432 Highland Road East	✓	

What do your Test Results Mean?

The results will provide you with two numbers: **Total coliform** bacteria and **E. coli** bacteria.

The chart below can help you understand what the numbers mean and what you should do.

If you have any questions call:

Hamilton Public Health Services **Safe Water Infoline: 905-546-2189**, or Ontario Ministry of the Environment and Climate Change (MOECC) **Wells Help Desk: 1-888-396-WELL (9355)**

Water Test Results Guide

Bacteria		Ontario Drinking Water Standards Interpretation	What does this mean? What should you do?
Total coliform per 100ml	5 or less	No significant evidence of bacterial contamination	<p>This sample is acceptable for drinking</p> <p>Sample and test your drinking water two more times, with each sample collected one to three weeks apart. This will provide a better picture of your well water quality and if you need to take any further action. If all samples pass go to a three times per year sampling schedule.</p>
E. Coli per 100ml	0		
Total coliform per 100ml	More than 5	Significant evidence of bacterial contamination	<p>Stop drinking your water.</p> <p>It may be unsafe to drink. Examine your well head area and get rid of any potential sources of contamination. Examine your cistern for leaks or sources of surface water entry.</p> <p>Retest your water. If your results are still the same, disinfect your well. Consider using a different source for drinking water until you have resolved your well water issues.</p> <p>Contact Public Health Services as soon as possible 905-546-2189.</p>
E. Coli per 100 mL	0		
E. Coli per 100 mL	More than 0	Unsafe to drink—animal or human waste contamination	<p>Do Not Drink Your Water.</p> <p>It is unsafe to drink as there is evidence of animal or human waste contamination. Boil water or arrange an alternate supply of drinking water.</p> <p>Examine the well head area and get rid of any potential sources of contamination. Disinfect your well and retest.</p> <p>Immediately contact Public Health Services Safe Water Info Line at 905-546-2189 for help with your next steps.</p>

How do Chemicals get into your Well Water?

Chemicals can enter the ground water table and move into your well from sources on or close to the ground.

This depends on the type of soil in your area, depth to the water table and the type of well you have.

Generally, heavier soils like clays will slow or even stop the downwards movement of chemicals. Chemicals tend to move faster through lighter soils like sand. Deeper water tables tend to be less affected by chemicals than shallow water tables. Also, drilled wells tend to be less affected than dug wells.

Should you Test your Well Water for Chemicals?

In Hamilton's rural communities the following drinking water wells are tested for chemicals:

- 49 drinking water systems regulated by the Ministry of Environment and Climate Change (MOECC) under the Safe Drinking Water Act that supply residential areas, schools, etc.
- Over 100 well-based Small Drinking Water Systems (SDWS) regulated by Public Health Services under the Health Protection and Promotion Act that supply trailer parks, restaurants, churches, etc.
- 11 monitoring wells in the rural areas of Hamilton that are part of the MOECC Provincial Groundwater Monitoring Network (PGMN) that do not supply drinking water but are tested annually. These results are available to the public through the MOECC.
- 19 City of Hamilton monitoring wells in rural areas

These results which include data from 2011-2015 along with data from the 2012 Rural Well Water Quality Report have been used in this report.

Ontario Regulation 169/03 Ontario Drinking Water Quality Standards (ODWS) include 78 chemical standards and their maximum concentration levels in milligrams per litre (mg/L). Of these 78 water quality standards, six health-related chemicals in Hamilton well water have been reported to Public Health Services at levels above the ODWS maximum concentration. See the summary table on the next page for more information. Fact sheets for the six chemicals are included in this report.

How Can you Test your Well Water for Chemicals?

Chemical testing of private wells is not available through Public Health Ontario Laboratories. The Ministry of Environment and Climate Change provides a list of approved commercial laboratories that test drinking water from private

well/cisterns on a fee for service basis.

For a complete list of approved commercial laboratories visit:

www.ontario.ca/page/list-licensed-laboratories

Chemicals Found in Hamilton Area Wells

Chemical	Ontario Drinking Water Standard	Well Water Result Exceedances	Areas Affected	What Should You Do?
Arsenic	0.025 mg/L (0.25 ppm) Standard changes to 0.010 mg/L on Jan 1, 2018	4 of 164 wells tested	4 wells with Arsenic concentrations above the new standard are located on Sulphur Springs Road, near Copetown, near Lynden and in Glanbrook	Public Health Services recommends that residents with private wells in the areas noted who use private well water for drinking consider testing
Barium	1.0 mg/L (1.0 ppm)	2 of 164 wells tested	The 2 wells above the ODWS are in Copetown and are within 3.5 km of each other	Owners of deep drilled wells in the Copetown area should consider testing for barium
Fluoride	1.5 mg/L (1.5 ppm)	16 of 183 wells tested	Fluoride can be present naturally and is more likely to occur at levels above the ODWS in wells drilled into bedrock	Owners of drilled wells should consider testing for fluoride if there are small children in the household
Lead	0.010 mg/L (10 ppb)	16 of 213 wells tested	Naturally found in the bedrock in the Niagara Escarpment	Owners of wells drilled into the Niagara Escarpment should test their well water for lead, especially wells located in the former township of Beverly
Nitrates	10 mg/L (10 ppm)	12 of 202 wells tested	Shallow or dug wells are at risk, especially: <ul style="list-style-type: none"> Near fertilizer or animal waste application Near old septic tank systems Areas with sandy or gravelly soil 	Owners of shallow or dug wells should consider testing for Nitrates and follow best practices in the maintenance of their well
Sodium	20 mg/L	49 of 59 wells tested	Sodium can be present in Hamilton wells at higher levels	People who need a low salt diet, such as those with high blood pressure should test their well for Sodium

Arsenic Fact Sheet

What is Arsenic?

Arsenic is a naturally occurring element. Trace amounts of arsenic are found in food, water, soil and air.

Breakdown and erosion of arsenic containing minerals in soils and rock, agricultural run-off, mining operations and industrial processes are all potential sources of arsenic in surface and ground water. Amounts of arsenic found in drinking water are generally higher in groundwater than surface water sources.

What level of Arsenic is allowed in drinking water?

On January 1, 2018 the limit for arsenic under the Ontario Drinking Water Standard (ODWS) will be lowered from the current limit of 0.025 mg/L to 0.010 mg/L.

This standard must be met by all public drinking water systems and is used as a recommended limit for private drinking water wells. The provincial arsenic limit is being lowered to align with the more protective federal limit which is based on the best worldwide arsenic exposure and health information available to Health Canada.

The current Health Canada Canadian Drinking Water Quality Guideline limit is set at 0.010mg/L.

What is known about the level of Arsenic in well water in Hamilton?

Public Health Services has tested arsenic concentrations in 100 SDWS wells in Hamilton. Traces of arsenic were detected in 25 per cent of the samples. Concentrations ranged from 0.001mg/L to 0.020mg/L averaging 0.006 mg/L. 14 Provincial Ground Monitoring Network (PGMN) and 50 MOECC regulated wells were tested for arsenic. None had levels above the new ODWS.

Public Health Services recommends residents using private wells in the following areas consider testing their drinking water for arsenic:

- the intersection of Sulphur Springs Road and Governors Road
- the Copetown area
- the Lynden area
- Trinity Church Road and Tisdale Road area south of Kirk and Chippewa Roads to Hall Road

A well in each of these areas had arsenic concentrations above the new ODWS of 0.010mg/L.

What are the health effects of high Arsenic levels?

Drinking water with levels of arsenic above the standard for long periods of time may increase the risk of cancer of the skin, lungs, urinary tract, bladder and kidney. Short term exposure to very high levels of arsenic can lead to abdominal and muscular pain, diarrhea and vomiting, skin rash and numbness.

Reducing Exposure

If arsenic levels above the ODWS are found, private well water users should consider a water treatment process such as reverse osmosis or adsorption/ion exchange to reduce arsenic concentrations. Consult a water treatment specialist for assistance.

References:

Health Canada; Canadian Drinking Water Quality: Guiding Technical Document: Arsenic (2006)
MOECC Drinking Water Information Fact Sheet- About Arsenic in drinking water (PIBS 6275e)

Barium Fact Sheet

What is Barium?

Barium is a naturally occurring element found in rock. Barium compounds are used in many industrial applications. Barium is also found in food, air and water. In well water, barium is found when bedrock or minerals that contain barium compounds dissolve into the groundwater.

What level of Barium is allowed in drinking water?

The Health Canada Drinking Water Guideline and Ontario Drinking Water Standard (ODWS) for barium is set at a precautionary level of 1.0 mg/L. This standard is mandatory for public water supplies and is used as a recommended limit for private water supplies.

What is known about the level of Barium in well water in Hamilton?

Public Health Services tested 100 Small Drinking Water Systems (SDWS) in Hamilton and found traces of barium in 77 per cent of these wells. None had barium levels above the ODWS.

Two of 50 Ministry of Environment and Climate Change (MOECC) regulated drinking water systems in Hamilton had barium levels slightly above the ODWS. Both of these were drilled well drinking water systems located in Copetown within 3.5 km of each other.

Barium appears to be commonly found in well water but rarely exceeds the ODWS. **Owners of drilled wells in the Copetown area should consider testing their well water for barium.**

What are the health effects of high Barium levels?

Health effects depend on the amount and time of exposure. Taking in large amounts of barium can cause vomiting, abdominal pain, diarrhea, difficulty breathing, numbness around the face and muscle weakness.

Health Canada has set a No Observed Effects Level (NOEL) for barium in drinking water at 7.0 mg/L; as studies have not shown adverse health effects in people who drink water containing Barium at that level. Drinking water with a concentration of Barium that is slightly above the drinking water standard is not considered to be a health hazard. However, as a precautionary measure, drinking this water should be avoided until the problem is corrected.

Reducing Exposure

Most treatment methods used for water softening can lower Barium in drinking water. Note: some water softening processes may increase the sodium concentration. Refer to the Sodium Fact Sheet on page 16 for more information about sodium in well water.

References:

Health Canada; Environment and Workplace - Barium, 1990 Province of Ontario-Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines: PIBS 4449e01, Revised June 2006

Fluoride Fact Sheet

What is Fluoride?

Fluoride is a naturally occurring element. Fluoride is used in the manufacture of aluminum, bricks, steel, glass, pottery, production of phosphate fertilizer etc. Fluoride can be found naturally in rock and is more likely to occur at levels above the Ontario Drinking Water Standard (ODWS) in wells drilled into bedrock.

What level of Fluoride is allowed in drinking water?

The ODWS for Fluoride is 1.5 mg/L. This level is set to protect children ages one to four years old that are most at risk from dental fluorosis (white or brown staining of teeth).

What is known about the level of Fluoride in well water in Hamilton?

Public Health Services tested the Fluoride concentrations in 119 Small Drinking Water Systems in Hamilton; 14 of 119 (12 per cent) wells had fluoride levels above the ODWS. One of 14 (7 per cent) Provincial Groundwater Monitoring Network wells had Fluoride levels above the ODWS. One of 50 (2 per cent) Ministry of Environment and Climate Change regulated drinking water systems had Fluoride levels above the ODWS.

Owners of deep (drilled) wells should consider testing their well water for Fluoride.

What are the health effects of high Fluoride levels?

Dental Fluorosis, a condition that changes the appearance of teeth, can happen if children get too much fluoride when their adult teeth are forming. Dental fluorosis is most often mild and looks like white flecks on the tooth surface. Dental fluorosis is not health threatening. It is a

cosmetic condition, and is not a problem for older children or adults.

Reducing Exposure

Test your well water to find out the naturally occurring concentration of fluoride. If the fluoride concentration is higher than 1.5 mg/L, consider a water treatment process to reduce fluoride levels or use an alternate source of drinking water. This is especially important if young children are exposed on a regular basis.

Reverse osmosis and distillation water treatment units can reduce fluoride in drinking water. Look for water filters with this certification on the label: ANSI/NSF Standard No. 58 for reduction of Fluoride. Not all systems are equally effective.

References:

Health Canada; Guidelines for Canadian Drinking Water Quality: Guide Technical Document-Fluoride (Dec2010) Province of Ontario-Technical Support document for Ontario Drinking Water Standards, Objectives and Guidelines; PIBS 4449e01, Revised June 2006, EPA Fact Sheet-Private Well Water and Fluoride.

City of Hamilton Fluoride Fact Sheet:

www.hamilton.ca/public-health/health-topics/fluoride

Lead Fact Sheet

What is Lead?

Lead is a known toxic metal. In Southern Ontario lead is found in the bedrock in different amounts and in spotty, random patterns. The bedrock under the northwestern part of Hamilton (former Beverly and West Flamborough Townships and Town of Ancaster) is part of a large rock formation running from north of Hamilton into the Niagara Region that contains lead. Well water is one source of exposure. Lead can also be found in and around your home including:

- **Paint in homes built before 1978.** Chipping, peeling or sanding paint can release lead into the air, household dust and soil.
- **Dust inside homes.** Dust can contain lead, especially in older homes that have lead-based paint.
- **Food or drinks stored in ceramic dishes, pottery or crystal glassware** made outside Canada.
- **Some toys and children's jewellery** made outside Canada.
- **Older PVC mini blinds.**
- **Clothes and shoes of people who work in lead-related industries**

For more information visit:
www.hamilton.ca/publichealth

What level of Lead is allowed in drinking water?

The Ontario Drinking Water Standard (ODWS) is set by considering total lead exposures from all sources including water, food, soil and air. The ODWS level for Lead is 10 micrograms per litre (ug/L) or 10 parts per billion. This standard is designed to protect young children, who are most vulnerable to the effects of Lead.

Children under the age of seven, pregnant women and women planning a pregnancy should not drink water with lead levels above the ODWS.

What is known about the level of Lead in well water in Hamilton?

Public Health Services tested the Lead concentrations in 104 Small Drinking Water Systems in Hamilton; three of 104 (3%) wells tested had Lead levels above the ODWS. These were drilled wells located in the western area of the former Town of Flamborough. None of the of 14 Provincial Groundwater Monitoring Network wells had Lead detected above the ODWS. One of 50 Ministry of Environment and Climate Change (MOECC) regulated drinking water systems had lead concentrations above the ODWS detected. This is the Lynden municipal drinking water system.

In 2006, 13 of 45 (29%) private residential wells tested by Public Health Services in the Kirkwall area had Lead levels above the ODWS. A Public Health Advisory was mailed to all rural residents on the potential for Lead levels to be above the ODWS in drilled wells located above the Niagara Escarpment.

This Public Health Advisory is still in place and can be seen at: www.hamilton.ca/home-property-and-development/water-sewer/public-health-advisory-naturally-occurring-lead-bedrock

Owners of wells drilled into bedrock should test their well water for lead, especially wells located in the former Township of Beverly (western Flamborough).

As Ba F Pb No₃ Na

Lead Fact Sheet Continued

What are the health effects of high Lead levels?

Lead can affect every organ and system in the body.

People who are at higher risk of health effects from lead are:

- Children under 7 years old
- Pregnant Women
- Women planning a pregnancy

Lead exposure in children can lead to:

- Poor school performance
- Behavioural problems

Long-term exposure can cause:

- Damage to kidneys and nervous system
- Attention deficit disorder
- Decreased intelligence

There is no known safe blood lead level in children. Efforts should be made to lower lead exposure for children whenever possible.

Contact your family doctor if you are concerned about your child's lead exposure. Your doctor can complete a blood test to measure your blood lead level.

Reducing Exposure

If lead is found in your well water:

- flushing your water will not lower lead levels.
- Boiling your water will not make it safe and can raise lead levels.

Treatment systems must be used to remove lead. These include reverse osmosis distillation units or water filters that meet ANSI/NSF Standard 53 for removal of lead.

For more information:

www.hamilton.ca/home-property-and-development/water-sewer/public-health-advisory-naturally-occurring-lead-bedrock

If you find high lead levels in your well water:

Do Not: Heat or boil your water to remove lead. Lead concentrations in the water can increase as the water is boiled, as some of the water evaporates during the boiling process.

Do Not: Cook with or drink water from the hot water tap. Hot water dissolves Lead more quickly than cold water.

Do Not: Use well water for making baby formula or baby food. Use water from a different source, like bottled or bring in water from a known safe supplier.

As Ba F Pb No₃ Na

Nitrate Fact Sheet

What are Nitrates?

Nitrates are chemicals that exist naturally in soil and groundwater. They come from the breakdown of plants and animal waste. Humans can be exposed to nitrates through both food and drinking water.

Common sources of nitrates in food include:

- vegetables such as carrots, spinach and lettuce
- smoked meats such as ham and bacon

Nitrates can get into the drinking water through:

- leachate from septic systems
- runoff or leachate from fertilized agricultural lands

It is common to find higher nitrate levels in agricultural areas where fertilizer is used and in neighborhoods where there are many septic tanks. Nitrate levels also tend to be higher in water from shallow dug wells, where underlying soils are sandy or where bedrock is close to the surface.

What level of Nitrate is allowed in drinking water?

The Ontario Drinking Water Standard (ODWS) for nitrate is 10mg/L. This standard is mandatory under the Ontario Drinking Water Standards for public water supplies and is used as a recommended limit for private water supplies.

What is known about the level of Nitrate in well water in Hamilton?

Public Health Services tested the nitrate concentrations in 119 Small Drinking Water Systems in Hamilton (SDWS); five of 119 (4 per cent) SDWS wells tested were above the ODWS for nitrates. These were all shallow bored wells. Four of 50 (8 per cent) Ministry of Environment and Climate Change (MOECC) regulated drinking water systems had nitrate levels detected above the ODWS.

Two of 14 (14 per cent) Provincial Groundwater Monitoring Network wells had nitrate levels detected above the ODWS. One of 19 City of Hamilton monitoring wells had a nitrate test result above the ODWS.

What are the health effects of high Nitrate levels?

A nitrate level in drinking water above 10 mg/L is a health concern for infants less than six months of age and for pregnant women. Nitrates can change to nitrites and lower the amount of oxygen carried in the blood. This can cause 'Blue Baby' Syndrome in infants less than six months of age. Pregnant women are also at risk when nitrate levels are high because nitrites are passed on to the unborn child. There is also a weak link between gastric cancer and nitrates in drinking water. This risk is not immediate but can occur after many decades of drinking water high in nitrates.

Reducing Exposure

If your well water has high nitrate levels, **do not use your well water to make infant formula or other infant foods for the first six months.** Use a different source such as bottled water. **Do not boil your water to lower nitrates. Boiling could make the nitrate levels higher.** Reverse osmosis or distillation devices will remove nitrates. You should consult with the manufacturers of these treatment devices to make sure they remove enough nitrates. Test your well water after a treatment device has been installed to make sure nitrate levels are below the ODWS.

Adapted from:

Wellington, Dufferin, Guelph Public Health Unit and Region of Waterloo Public Health.

As Ba F Pb **No₃** Na

Sodium Fact Sheet

What is Sodium?

Sodium is a common element in the natural environment and an essential nutrient required for normal functioning of the human body. As such, sodium is not considered a toxin and there is no maximum acceptable concentration of sodium in drinking water. Sodium levels in well water may be significantly increased by water softeners, road salting near a well or by low water levels.

What level of Sodium is acceptable in drinking water?

There is no Ontario Drinking Water Standard for sodium. At approximately 200mg/L sodium will cause a salty, unpleasant taste to water. When sodium is above 20 mg/L (20ppm) in a public drinking water system action is taken to inform the water users. This is done to allow those with hypertension (high blood pressure) or who are on a sodium restricted diet to consult with their doctor about the sodium level in their drinking water. If you have high blood pressure or are on a sodium restricted diet you should test your drinking water for sodium and consult with your doctor.

What is known about the level of Sodium in well water in Hamilton?

22 of 50 (44 per cent) MOECC regulated drinking water systems had sodium levels above the ODWS notification level.

11 of 11(100 per cent) PGWMN wells had sodium levels above the notification level.

Sodium appears to be found above 20 mg/L in many wells across Hamilton. However, sodium levels do not appear to be increasing. The chart on the following page shows the average sodium levels in Hamilton area PGMN wells during the period 2002-2014.

What are the health effects of high Sodium levels?

Our bodies need a small amount of sodium to be healthy, but too much can lead to high blood pressure, a major risk factor for stroke, heart disease and kidney disease.

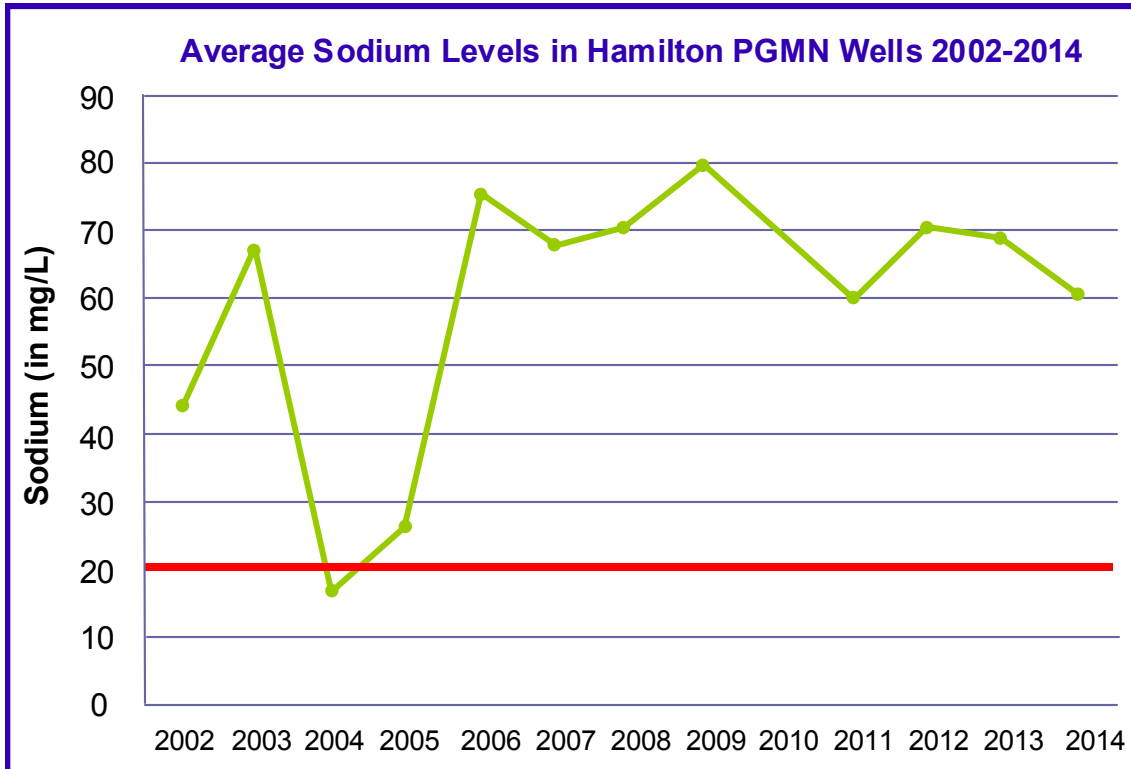
To make sure that sodium intake is not a health risk, people aged 14 and over should aim to have less than 2300 mg of sodium per day. Children ages one to three years should have less than 1500 mg, and children ages four to eight years should have less than 1900 mg of sodium per day. Sodium from drinking water is only a part of a person's daily intake. This chart contains the sodium content in several healthy foods for comparison.

Reducing Exposure

People who drink well water and are on a sodium restricted diet, have high blood pressure or have congestive heart failure should consider testing their water for sodium. This is especially important if the water supply system has a water softener, if the well is located near a roadway, or in an area where the bedrock is close to the surface, or an area of sandy soils, or if it is a dug well.

For further information on reducing dietary sodium, call Eat Right Ontario at 1-877-510-5102 to speak to a registered dietitian.

Sodium Fact Sheet Continued



Data sourced from: Ontario MOECC

Sodium Content of Some Common Foods

Food	Sodium (mg)	Food	Sodium (mg)
8 baby carrots, 80 g	62	Yogurt, plain, low fat, 175 mL	98
Swiss chard, 125 mL	165	Cheddar cheese, 50 g	322
Whole grain, whole wheat bread, 35 g 1 slice	178	Haddock, baked/broiled, 75 g	196
Toasted oats cereal, 30 g	207	Egg, 1 large	63
1% milk, 250 mL	113	Ground beef, lean, pan-fried, 75g	63
		Salt, table, 5 mL (1 tsp.)	2,373

Source: Canadian Nutrient File, Health Canada, accessed August 2016

As Ba F Pb **Na** NO₃

Testing Recommendations for your Type of Water Supply

Water Supply	Testing Recommendations
<p>Shallow Wells: (dug, bored or shallow drilled wells less than six meters deep)</p> <p>Water is usually less mineralized (softer) but more likely to run dry during drought conditions and be susceptible to naturally occurring and man-made pollutants. Examples:</p> <p>Bacterial pollutant sources:</p> <ul style="list-style-type: none">• Surface water runoff• Nearby septic systems• Animal waste/manure <p>Other pollutants used at or near the ground surface:</p> <ul style="list-style-type: none">• Nitrates associated with manure, fertilizer and septic system effluent• Sodium naturally occurring or associated with road salt or water softener recharge water• Petroleum based chemicals• Pesticides	<ul style="list-style-type: none">• Visually and periodically inspect your well• Maintain well in sound condition• Direct surface run-off and locate pollutant sources away from well• Test for Total coliform and E. coli bacteria three times per year. Use free bacteria testing service available through City of Hamilton Public Health Services• Test for Nitrates especially if infants in household• Test for Sodium especially if occupant(s) is on Sodium restricted diet and uses the water for drinking• Test for petroleum and pesticides if signs of potential contamination are observed, such as odours, changes in water colour, nearby spills, etc.
<p>Deep Wells: (drilled wells more than six meters)</p> <p>Water from deeper sources is usually more protected from surface pollutants and is less susceptible to water shortages during drought conditions. Deeper water sources are usually more mineralized (harder) because of the longer contact with a wider variety of minerals found in bedrock.</p> <ul style="list-style-type: none">• Hamilton area bedrock is fractured limestone. Water quality is generally good but tends to be hard and can have taste, odour, and colour problems from dissolved Calcium, Sulphur, Manganese, Iron, etc.• Health related chemicals occur naturally and sporadically. Testing of well water in Hamilton shows the most likely health related chemicals to be above the Ontario Drinking Water Standards are Sodium, Lead, Fluoride, Nitrate and Barium	<ul style="list-style-type: none">• Test for Total coliform and E. coli bacteria three times per year. Use free bacteria testing service available through City of Hamilton Public Health Services• If testing general chemistry of water from deeper wells, it is recommended that a drinking water chemical scan include the following health related chemicals: Lead, Sodium, Fluoride, Nitrate and Barium.
<p>Cisterns: An underground storage tank used to store hauled water</p> <ul style="list-style-type: none">• Cisterns are prone to bacteria contamination• Use municipal water delivered by a water hauler that is inspected by Public Health Services. Confirm with hauler or Public Health Services that they are inspected• Liners, if used, should be made from food grade materials only	<ul style="list-style-type: none">• Test for Total coliform and E. coli bacterial four times per year. Use free bacteria testing services available through City of Hamilton Public Health Services• Inspect, repair and clean annually• Disconnect eavestrough from cisterns• Install a water disinfection device such as a chlorinator or Ultra Violet Light system

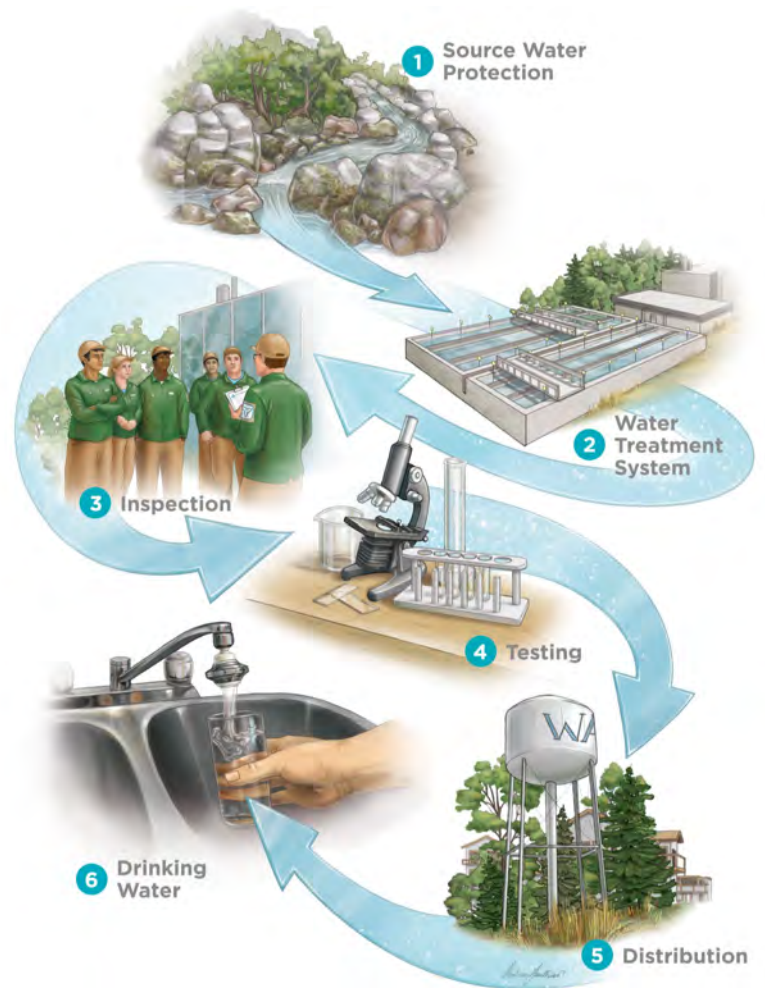
Drinking Water Source Protection

The Clean Water Act, 2006

The Government of Ontario's approach, for ensuring clean, safe and sustainable drinking water, uses multiple barriers that prevent or reduce drinking water contamination, beginning at the source, all the way to the tap. This is called the 'multi-barrier approach' and involves actions such as water treatment and distribution systems, water testing and proper training.

The first barrier in this 'multi-barrier approach' is protecting drinking water at the source, which involves selecting the best available source (e.g., lake, river, aquifer) and protecting it from contamination.

The purpose of the *Clean Water Act, 2006* is to protect current and future sources of drinking water. As a result of this Act, communities in Ontario are required to develop Source Protection Plans to protect their municipal sources of drinking water.



Who is Affected by Source Protection Plan Policies?

If your property is in a vulnerable area and you are carrying out activities that are a threat to drinking water sources, then you **may** be subject to the Source Protection Plan policies.

Vulnerable areas in Rural Hamilton where these policies currently apply are called Wellhead Protection Areas.

A Wellhead Protection Area is the area around the wellhead where land use activities have the potential to affect the quality of water that flows into the well.

Search by your physical address at:

www.applications.ene.gov.on.ca/swp/en/index.php (English) or

www.applications.ene.gov.on.ca/swp/fr/index.php (French)

What are Source Protection Plans?

Risks to local municipal drinking water sources were identified and strategies developed to reduce or eliminate these risks.

Source Protection Plans contain policies that either recommend or require that actions be taken to address activities identified as threats in the science-based Assessment Reports.

The Government of Ontario has approved all 22 Source Protection Plans in the province.

Implementation of all Source Protection Plans is well underway across the province, by various agencies including municipalities, provincial ministries and conservation authorities, to name a few.

Risk Management Office

The Risk Management Office in the City of Hamilton was established to assist in the enforcement of the Clean Water Act. It is comprised of a Risk Management Official (RMO) who will be assisted by Risk Management Inspectors (RMIs), all of who are trained to standards set by provincial regulation. The RMO and RMIs work closely with property owners, municipal staff, local conservation authorities and other agencies.

Risk Management Plans

A Risk Management Plan (RMP) regulates activities that pose a significant drinking water threat to municipal drinking water sources. The RMP includes best management practices designed to ensure that risks to the municipal drinking water source are reduced or eliminated. The RMP is generally negotiated between the person doing the activity and a Risk Management Official.

What are the next steps for the City of Hamilton's Risk Management Office?

Implementation of the policies in the Source Protection Plans is currently underway. New tools have been introduced that regulate development activities occurring in wellhead protection areas, which may pose a risk to the municipal drinking water supply. Verification of the potential threats to Hamilton's municipal water sources is also ongoing. This verification process includes desktop analysis, field verification, letters and door-to-door outreach to owners and tenants.

For more information:

Web: www.hamilton.ca/Sourcewater

Email: Sourcewater@hamilton.ca

Phone: 905-546-2424 x 4018

Drinking Water Threats



Livestock **grazing, pasturing, outdoor confinement areas** and farm-animal yards



Commercial **fertilizer** and **Pesticide** applied to land, handled or stored



Chemicals used in the **De-icing** of an aircraft



Fuel handled or stored



Storage of **Snow**



Waste disposal sites



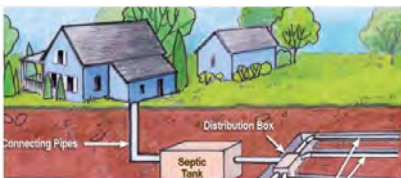
Activities **taking water from an aquifer** (groundwater) or surface water body (lake or river)



Activities **reducing recharge** of an aquifer's underground water sources (e.g., pavement)



Road salt applied, handled or stored



Sewage systems (including septic)



Handling and storage of **Dense Non Aqueous Phase Liquids (DNAPL)** and **Organic Solvents**



Agricultural (ASM) and non-agricultural source material (NASM) applied to land, stored, handled or managed

Abandoned Wells and Source Protection

Properly abandoning an old, unused well means more than just disconnecting the water line to your home. To protect the safety of users and the safety of the aquifer, abandon old or unused wells (called decommissioning) by properly filling and sealing the well. Well abandonment must be done by a licensed contractor. A well is an open connection between the clean underground water source and the surface. Good source protection includes making sure old well connections do not contaminate the groundwater source with surface water.

Local conservation authorities make money available to landowners to properly abandon their old, unused wells. Financial assistance up to 100 per cent is available. Contact Hamilton Conservation Authority and Conservation Halton at 905-336-1158 ext. 263 or 905-525-2181 ext. 165,181,195 for program details.

More Information

Public Health Services Safe Water Infoline: **905-546-2189** Monday to Friday, 8:30 am - 4:30 pm. Speak with a Public Health Inspector about health-related water test results, water treatment options and well maintenance.
www.hamilton.ca/safewater

Ontario Ministry of the Environment and Climate Change (MOECC) Wells Help Desk:
Toll Free: **1-888-396-WELL (9355)**
Email: wellshelpdesk@ontario.ca

Public Health Ontario: Information on drinking water-including information on water quality and testing your water.
www.publichealthontario.ca/en/BrowseByTopic/Pages/default.aspx#Tab_W

Health Canada: Information about drinking water quality topics, including health related chemicals
www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php#tech_doc

Ministry of the Environment and Climate Change (MOECC): Drinking water resources page. Access drinking water publications and documents including a Directory of Licensed Well Contractors in Ontario, Requirements and Best practices, Well Record Request forms, etc. A Water Well Record can provide essential information about a well including construction details, casing depth, water depth, flow rate, recommended pump rate, etc.
www.ontario.ca/page/drinking-water

Ontario Drinking Water Quality Standards
Standards for over 150 parameters; applies to drinking water supplies that provide drinking water to the public. Compare your chemical test results to these Drinking Water Standards.
www.e-laws.gov.on.ca/html/regs/english/elaws_regs_030169_e.htm

Wells Regulation: Regulates who can work on a well, legal requirements for well construction, location and abandonment.
www.elaws.gov.on.ca/html/regs/english/elaws_regs_900903_e.htm

Testing Laboratories: The MOECC provides a list of approved commercial laboratories that test drinking water from private well/cisterns on a fee for service basis.
www.ontario.ca/page/list-licensed-laboratories

Well Abandonment: Financial assistance up to 100% is available for landowners to properly decommission a non-used well on their property. Contact Hamilton Conservation Authority and Conservation Halton at **905-336-1158 ext 263** or **905-525-2181 ext. 165,181,195** for program details

Well Aware: Well Aware is an Ontario MOECC sponsored program that encourages Ontario residential well owners to protect their wells. This organization can arrange a home visit to help you identify potential risks to your well. For additional information visit: www.wellaware.ca/

National Sanitation Foundation (NSF): Independent certifying organization that provides lists of water treatment devices tested against NSF standards for the removal of contaminants from drinking water www.nsf.org/consumer/drinking_water/index.asp?program=WaterTre

