Well Aware

Contents

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Be *well aware*

Your family's health *depends* on it!

Your well taps into one of nature's treasures – cool, clean groundwater.

You and your family depend on this precious resource every day for cooking, washing, and a continuous supply of safe drinking water.

About this booklet

As a private water well owner, it is your job to be well aware — to understand the basics of well maintenance and operation, and to take the necessary actions to keep your water wells in safe running order. This booklet is a guide to caring for your wells.

To improve your working knowledge of wells and the **well life cycle**, read the sections on groundwater and well location, construction, upgrading, and proper plugging and sealing of unused wells.

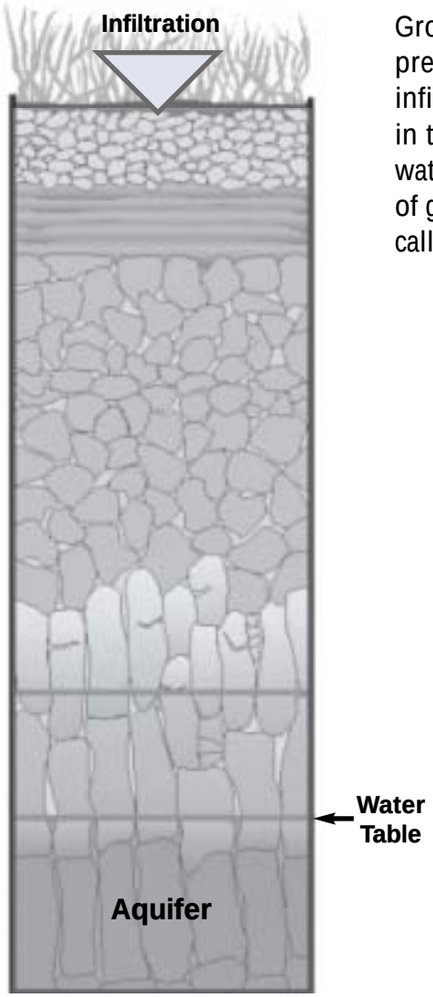
For an outline of your ongoing responsibilities as a well owner, read the sections on **well maintenance**, including well water protection and pollution prevention. An inspection and maintenance routine is recommended for every well on your property.

For a better understanding of **well water quality** issues and what to do about them, read the sections on groundwater basics, potential water contaminants, testing, remedies, and treatment systems.

The back of the booklet includes information about **hiring contractors** and using your **well records**. Further **resources** and contacts are listed. And handy **diaries for water testing and well maintenance** are included.

It's the law. Regulation 903 of the Ontario Water Resources Act sets out your obligations as a well owner under Ontario law.

Groundwater basics



Saturated layers below the water table that transmit significant quantities of groundwater are called aquifers. Credit: *BMP: Water Wells*

Your well gets its water from an underground water source called groundwater.

Groundwater originates from surface water and precipitation, including rain and melting snow, that has infiltrated the earth, filling the cracks and open spaces in the rocks and the soil. Saturated layers below the water table that store and transmit significant quantities of groundwater – i.e., enough to supply a well – are called *aquifers*.

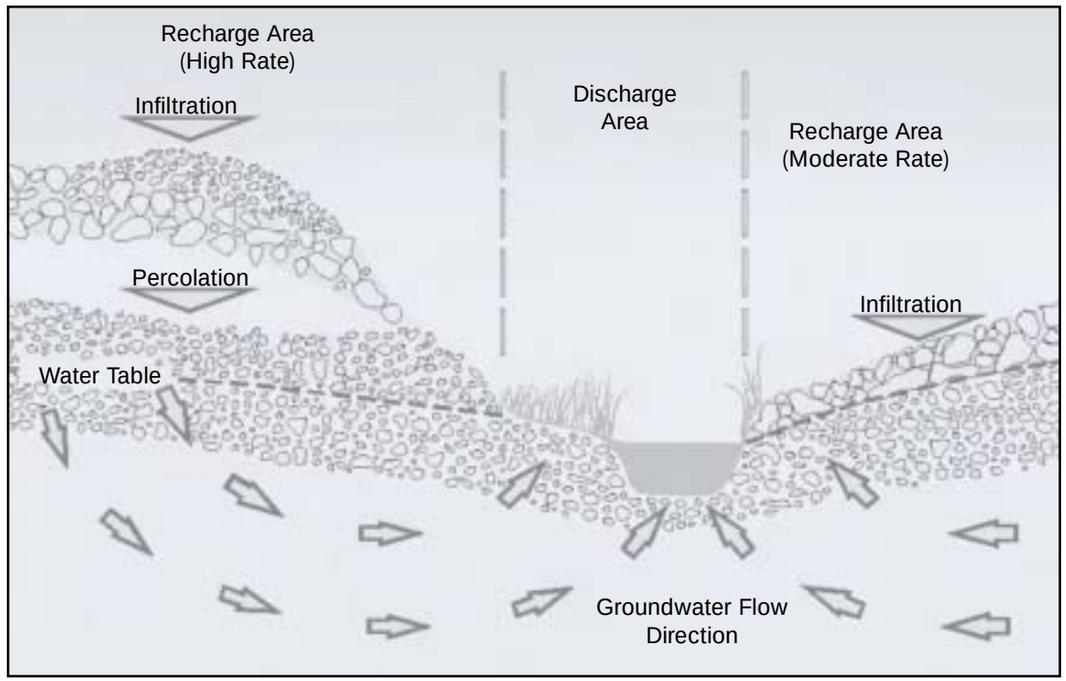
Keeping it clean

Surface spills of contaminants like fuel can infiltrate the soil and contaminate groundwater. The risk of contamination is greatest where the ground surface is highly water permeable, e.g., in areas with coarse soils or fractured bedrock at or near the surface.

Groundwater can also be contaminated by underground sources, such as leaking fuel storage tanks or malfunctioning septic systems. Poorly constructed or deteriorating wells can act as a direct pipeline for surface pollutants to contaminate the aquifer. Unused and unmaintained wells are a special concern if they haven't been safely plugged and sealed.

Depending on the type of soil or rock, groundwater may be filtered and very clean. But once an aquifer is contaminated, it can take a very long time to recover, if ever.

Well Life Cycle



Compared to surface water, groundwater usually moves very slowly – from a few millimetres to a few metres a day. Groundwater affects the quality and quantity of surface water where it discharges into streams, rivers, wetlands, and lakes. Credit: *BMP: Water Wells*

Groundwater *flows*

It is impossible to determine the exact direction of groundwater flow based on surface features alone. However, we know that water in the aquifer near a pumping well will flow toward the well.

The danger to your well of groundwater contamination is greatest when the contaminant source is close to your well. However, on rare occasions contaminants have been known to spread over several kilometres.

Locating *a new well*

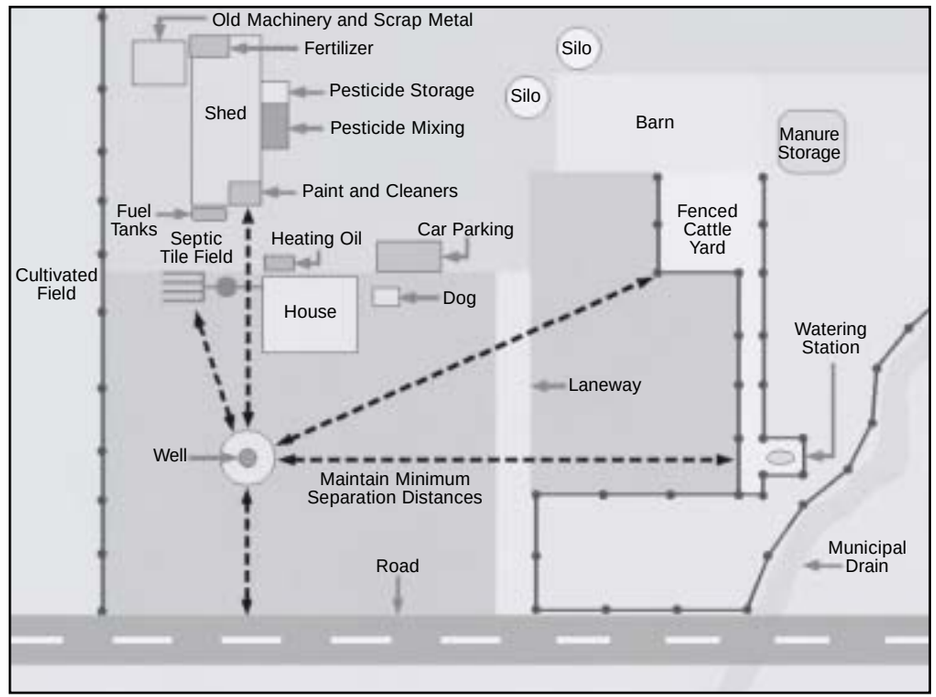
If you are constructing a new well, think carefully about the best location, that is, a high point of land with good access and separation from potential contaminants. Contact an MOE-licensed well contractor to locate a well on your property.

The ground must slope *away from the well*

Locate your well on a higher point of land so that run-off and contaminants drain away from the well head rather than toward it. The area nearby can be landscaped and contoured to help direct run-off away from the well.

Access

Wells and well-related equipment must be sited so they can be easily accessed at all times for cleaning, treatment, repair, testing, and visual examination.



Verify adequate separation from potential contaminants. Credit: *BMP: Water Wells*

Separation from contaminants

Wells must be located a safe distance from potential sources of contamination such as fuel storage tanks, stockpiles of chemicals like pesticides or road salt, septic systems, gardens, manure piles, livestock, and roads and driveways.

Wells must be separated from potential contaminant sources as follows:

- at least 15 metres (50 feet) for drilled wells with watertight casings that extend 6 metres (20 feet) or more below ground level
- at least 30 metres (100 feet) for all other wells

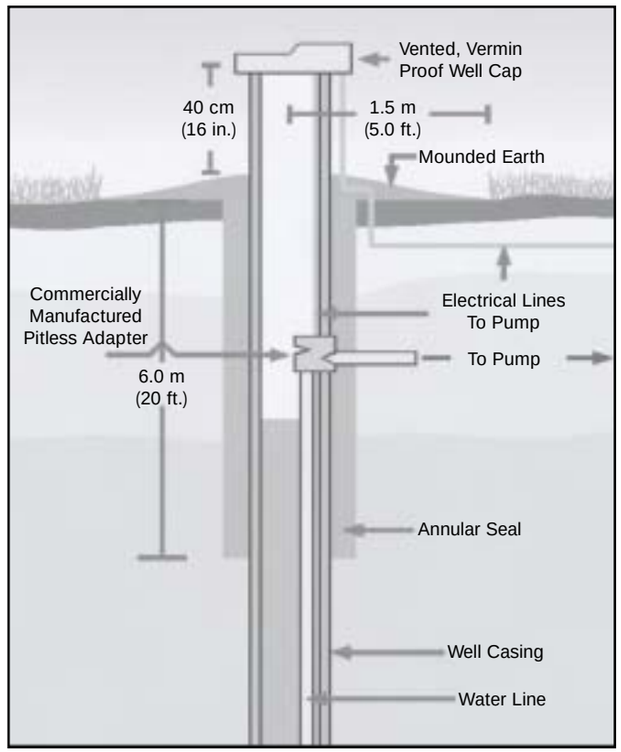
These minimum distances do not guarantee safety. Increase the separation wherever possible, and eliminate or reduce sources of contamination.

Well construction

A properly constructed well forms an effective barrier against surface run-off that may enter and contaminate the well.

Water must infiltrate and pass downward through the soil and/or rock before it can reach the aquifer from which your well gets its water.

Over the years, well design has improved to reflect advances in technology and our understanding of potential pathways of contamination. REGULATION 903 of the Ontario Water Resources Act outlines minimum construction standards for all types of wells. Always hire a contractor licensed by the Ontario Ministry of the Environment who is familiar with these standards.



Distances in illustration are minimums. Credit: *BMP: Water Wells*

Well casing

New wells should be lined with a watertight casing designed to keep out contaminants. To be effective, this casing must extend to the appropriate depth, i.e., to the part of the aquifer from which the well draws water, or into the bedrock. In any event, it must normally extend at least 6 metres (20 feet) below grade. See REGULATION 903 for details. The well casing must also extend at least 40 centimetres (16 inches) above the finished grade to help prevent contamination by surface water and run-off.

Well *pits*

Prior to 1985, well pits were commonly used to protect water line connections from freezing. However, well pits are no longer considered safe because they often fill with surface water and debris, leading to contamination. On new wells the well casing must extend above ground level and a pitless adapter (see opposite) is used to provide a sealed waterline entry at depth so that water lines are protected from freezing.

Well pit with concrete cover.
Credit: *BMP: Water Wells*

The annular seal

When your well is drilled the hole in the ground is bigger than the well casing. The resulting gap – the annular space – must be filled with a watertight sealant such as bentonite that does not shrink or crack under the ground. For maximum protection, the sealant should extend the full length of the casing. See REGULATION 903 for prescribed minimum depths.

The annular seal serves as a barrier to run-off, surface water, and near-surface waters that could otherwise travel down the outside of the casing and contaminate the aquifer.

Well cap

REGULATION 903 requires that your drilled well be capped with a commercially manufactured vermin-proof well cap. Modern caps have rubber gaskets and screened vents inside to prevent entry of “foreign material” such as vermin, insects, and decaying plant material. Loose-fitting caps found on older wells make these wells a comfortable home for insects and vermin.

Upgrading *your well*

It is possible – even likely – that your existing well does not meet the new construction standards described in the preceding section. What should you do?

Consider upgrading your existing well for the sake of your family's health and safety and the security of your drinking water source.

Talk over your options with an MOE-licensed well contractor who is experienced with upgrades and familiar with conditions in your area.

Faulty annular seal.

Upgrade your well, *or construct a new one?*

If there are water quality problems with your existing well, one option is to drill a new well. A new well may be the best way to go if your existing well is:

- badly located, close to permanent sources of contamination, or at risk from flooding
- not producing adequate water supplies
- substandard and cannot be upgraded for technical or regulatory reasons

Do *you* have *a high risk well?*

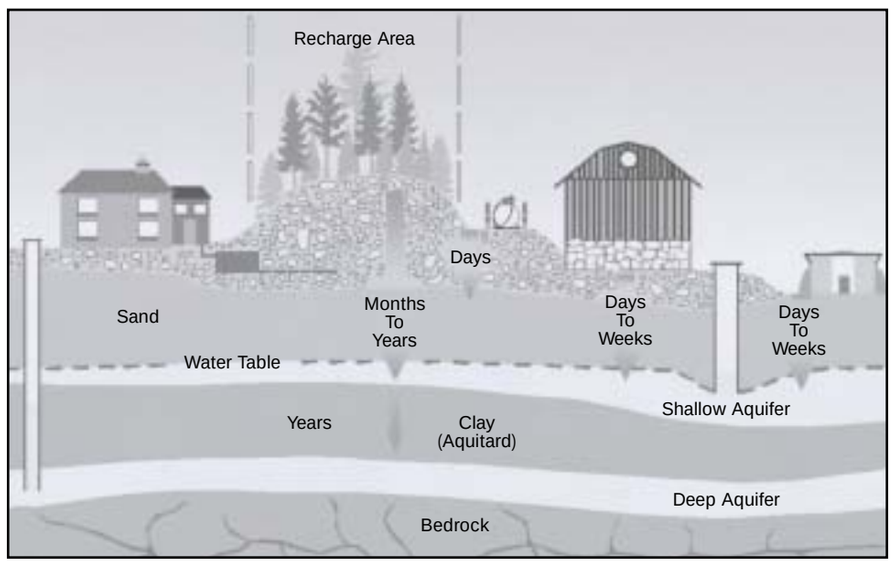
Some wells are at higher risk of contamination and require extra care and attention. Consider the following factors:

- shallow wells (less than 6 metres or 20 feet deep) are at higher risk than deeper wells
- dug wells are at higher risk than drilled wells
- older wells are at higher risk than newer wells

Another important risk factor is the type of soil and/or rock between ground surface and the aquifer from which your well draws its water. Put simply, your well is at lower risk if these materials effectively stop surface contaminants from reaching the aquifer; it is at higher risk if contaminants can infiltrate more rapidly.

For example, coarse soils like sand and gravel are a less effective barrier than thick deposits of fine soils like clay loams or silty clay. If your well is in bedrock, it is at higher risk if fractures extend to ground surface or near the surface.

Groundwater studies for your area may tell you whether local aquifers are more or less susceptible to impacts from surface contaminant sources.



Water infiltrating from the surface may reach a shallow aquifer in days to weeks. It could take years to reach a confined deeper aquifer. Credit: *BMP: Water Wells*

Plugging *and* sealing

An unused and unmaintained well that hasn't been properly plugged and sealed poses health and safety hazards for animals and humans, especially children.

Unused and unmaintained wells threaten groundwater.

A well that is no longer used or maintained can become a direct pipeline for surface water or run-off to reach the aquifer. Unused and unmaintained wells threaten the groundwater that supplies your well, and possibly your neighbours' wells.

It is your responsibility under Regulation 903 to ensure that your unused wells are properly plugged and sealed.

Don't try to seal your own well – it is not as easy as it seems. If you simply fill up your unused well with sand, gravel, stones, debris, or garbage, you won't prevent the flow of surface water or run-off into the well. The material in the unused well may even contribute to contamination of your groundwater source.

If an unused and unmaintained well is on your property, you are legally responsible for ensuring that it is plugged and sealed properly.

Hire an MOE-licensed well contractor who has the expertise and equipment to do the job properly, as required under Regulation 903.

Protecting your *well water*

As a responsible well owner, you need to carry out a regular program of well maintenance. Taking care of your well is a three-step process:

1. protect your well water at the ground surface by avoiding, eliminating, or reducing contaminants
2. inspect your well regularly and keep your well in good running order
3. test your well water regularly and respond to contamination problems

The following sections of this booklet will show you how.

The protection of source waters is the first step in protecting your well water. Source protection is often the most cost-effective way to keep contaminants out of drinking water. And it is almost always less expensive to keep water clean than to try to deal with the consequences of contamination.

Well water protection *starts at home*

The most immediate threats to the safety of your well water are usually nearby – in your own yard.

As part of your routine well maintenance schedule, walk the grounds within a 30-metre (100-foot) radius of your well. Look for potential threats. A complete search for potential contaminants is recommended, at the same time as you inspect your well (see pages 15-16). You should also look for changes that could affect your well as part of your daily and weekly routines.

Keep these contaminants away from your well:

- pet and livestock wastes
- gasoline, diesel, home-heating fuels
- pesticides and fertilizers (chemical or natural)
- other hazardous chemicals, including paint, solvents, barbecue starter fluid, etc.
- de-icers (used to melt ice on roads, driveways, sidewalks)
- and any other substance you don't want in your family's drinking water.

Chemicals *and fuels*

Any chemical or fuel spills that infiltrate the ground can contaminate your drinking water source. Check that gasoline, pesticides, and other chemicals are stored in proper containers designed to help prevent spills or leakage. Don't store these materials anywhere near your wells.

- Refuel lawnmowers and other machinery a safe distance from the well. (One litre of gasoline can contaminate 1 million litres of groundwater.) Refuel over hard surfaces to help prevent infiltration of spills.
- Change the oil in your vehicle on a sealed surface such as pavement or concrete away from the well.
- Clean up spills with an absorbent material (clean sand or kitty litter) and remove to a Household Hazardous Waste depository. Keep a bucket nearby for quick access when spills occur.

Never hose down spills.

Fuel and chemical leaks and spills can pollute groundwater

Septic *systems*

Locate your septic system down grade and away from your well. Ensure that your system conforms with the Ontario Building Code. Keep chemicals other than human waste out of the system. Pump out your septic tank every two-three years, or ask your pumper to specify the appropriate pump-out frequency. Keep your system in good running order.

Gardens

Eliminate gardens adjacent to your well. Plant a permanent low-growing ground cover such as grass. Don't use fertilizers or pesticides.

Underground *storage tanks*

Underground storage tanks and associated pipes and fittings may leak, especially if they are over 15 years old or lack corrosion protection. Underground storage tanks are a special concern if the water table is shallow, or if the tank is close to your well (or surface water). If possible, replace underground tanks with above-ground storage that has proper spill/leak containment.

Above-ground *storage tanks*

If storage tanks are required, keep them as far as possible from your well. They should be at least 15-30 metres (50-100 feet) away, depending on well type, as required by Regulation 903. Install sheltered tanks with spill containment, as required by regulation, capable of holding 125 per cent of the volume of the tank. Security and protection from damage are advisable.

Abandoned *tanks*

Look for evidence of abandoned tanks that pre-date your ownership, including pipes sticking out of the ground. An abandoned tank may still contain harmful liquids that will leak as the tank corrodes.

Animal *wastes*

Livestock and pet wastes are a serious potential threat to well water, as the Walkerton tragedy showed. Adopt best management practices as promoted by the province's agriculture ministry and the Ontario Federation of Agriculture.

Source protection – *the bigger picture*

Contaminant sources affecting your well are most often found in your own backyard. Address these first. However, you should also support actions to protect all sources of drinking water for your community.

Municipal land-use plans need to identify vulnerable ground and surface waters. Land-use plans should provide the necessary protection through controls on the location, amount, and type of development. Contact your municipality to find out if a provincially funded groundwater study has been completed for your community.

Major sources of contamination need to be curbed, like polluting industries and urban and agricultural run-off.

Programs need to be in place to reduce risks of groundwater contamination from unused wells, open excavations, quarries, and contaminated sites.

Get involved in protecting sources of drinking water for your community. Contact your municipality for information.

Inspecting *your well*

Regulation 903 requires that you maintain your well to keep out surface run-off and foreign materials.

It is recommended that you conduct an inspection of your well at least once a year, as outlined below, at the same time as you check for potential contaminants (see page 11).

If you've got problems with your well water, or concerns about your well, have your well inspected by a MOE-licensed well contractor.

☑ Access

Regulation 903 requires you to keep your well accessible. As part of your maintenance routine, keep your well head clear of brush, debris, and other obstructions.

☑ Well cap

Check the well cap for signs of cracking or damage, and get it fixed or replaced immediately if there is a problem. The well cap should be firmly attached to the casing. The vent should face the ground and be properly screened to keep out insects. Only air should enter. Clean the air vent regularly to remove debris and moisture.

☑ Annular seal

Look for problems with the sealant used to fill the annular space between the drilled hole and the well casing. A depression in the ground around the edge of the casing can indicate that the sealant has shrunk, collapsed, or cracked. If you can move the casing around by pushing it, that's a bad sign. Cracking and gaps allow run-off and surface water to move down the outside of the well casing and contaminate your drinking water. A faulty annular seal needs to be repaired. Call an MOE-licensed contractor.

☑ Well casing – *condition*

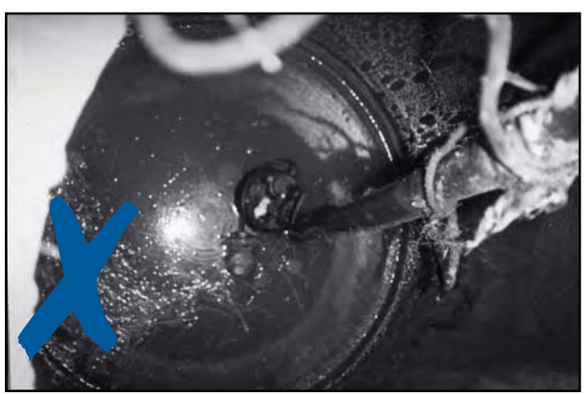
Look for any external signs of damage, cracking, or dislocation of your well casing, e.g., due to vehicle damage. If you've got a small diameter well (drilled), removing the cap is not recommended. Visibility is limited and you could cause contamination or damage, especially if you have a submersible pump. Some licensed well contractors can inspect your casing with a down-hole camera. If you've got a larger diameter well (e.g., dug or bored), you can remove the lid with care. Inspect the inside the casing using a strong flashlight. Look for holes or cracks, including evidence of animal infestations, or stains coming from the casing joints.

☑ Backflow *prevention*

Under certain circumstances, contaminated water can flow backwards through your plumbing into your well. Backflow prevention devices are available from your licensed well contractor or pump installer.

☑ Well *pit*

Remove the cover from your well pit, and look for water, debris, vermin, etc. **Do not enter the pit, or breathe the gases which may fill the pit.** The pit should be clean and dry. If water or other material has entered the pit, your well water is at high risk of contamination. Clean out the pit. Consider upgrading or constructing a new well.



Caution: Take extra care to ensure that children do not gain access to the well pit. Adults should also beware of the potential presence of toxic gases, which may be deadly. **Do not enter the pit.**

Possible contaminants

What could be wrong *with my water?*

Even though your water may appear to be fine, there are many possible contaminants that you can't taste, see, or smell. See the following pages for information about water quality testing and solutions, and the Resources section for testing contacts.

Drinking contaminated well water can make you and your family members ill. It can even be fatal.

Bacterial contamination may cause stomach cramps, diarrhea, and other problems.

Chemical contamination is equally dangerous. Effects vary.

Total coliforms Coliforms are bacteria. Even a low count of total coliforms (1-5) may indicate the presence of other more harmful bacteria with similar lifecycles. Caution and retesting is recommended. A higher total coliform count (6-80) is a strong indicator that disease-causing micro-organisms may be present. Assume that your water is unsafe for drinking without treatment.

E.coli *E.coli* is one strain of bacteria associated with human and animal fecal matter. Any detectable presence of *E.coli* in your well water means your water is unsafe for drinking without treatment.

Nitrate Nitrate is not bacteria, it is the end result of a chemical reaction. The presence of nitrate in your water can be the result of commercial fertilizers and human or animal wastes. Infants less than six months old can become sick from drinking formula or eating cereals made with water high in nitrate. Nitrate reduces the amount of oxygen in the blood, resulting in blue baby syndrome.

Sodium Common domestic water softeners increase the level of sodium in drinking water. Individuals on salt-reduced diets should consult their physician if sodium levels in drinking water exceed 20 mg/litre. Salts used on roads, driveways and other paved areas may also contaminate groundwater.

Metals and minerals Metals and minerals in your water can come from natural sources, or from landfills, road salts, septic systems, agriculture, golf courses, mining, and construction. Lead and copper can leach out of your plumbing. Chloride, which comes from many of these sources, can be an early indicator of further contamination.

Gasoline, oil and diesel fuels Look for these if you've had a spill, have a buried fuel tank near your well, or detect fuel odours or films.

Solvents Test for these if you are concerned about chemical spills, nearby solvent use, or a strong chemical odour. Solvents have been linked to cancer.

Pesticides Test for these if you are concerned about past or present use of pesticides near your well, if you've had a spill or leak, or if you are concerned about possible backflow through your plumbing into your well during mixing of pesticides.

Water testing

See the Resources section of this booklet for information about testing laboratories.

Test for *harmful bacteria*

It is recommended that you test your well water regularly for bacteria, including total coliforms and *E.coli*. Call your local health unit, which provides these tests free of charge. Keep a careful record of well testing results (see page 29).

Testing at least three times a year for bacteria is recommended by the Ontario Ministry of the Environment and the Ontario Ministry of Health.

Early spring is a good time to test your well water for bacteria. Another good time is the day after a heavy rainfall. Melting snow and running water can carry surface contaminants into your well water. If your well water is safe under these conditions, it is most likely to be safe the rest of the year.

Test regularly even if your water seems fine, because you can't always taste, smell or see bacteria or other contaminants. Don't rely on your neighbour's test results – wells that are only a few steps apart usually have different water quality.

Besides routine testing, you should also test:

- after major plumbing work or well repairs
- if you detect changes in water quality, including taste, odour, and appearance
- if regular well users experience unexplained health problems that may be water-related
- after flooding. (If flooding is common in your area you may want to retrofit your well. Contact an MOE-licensed well contractor.)

Initial testing *for bacteria*

A single test for total coliforms and *E.coli* is not always enough to determine the quality of your well water. If your well has not been tested regularly, submit three samples at least one week apart. Do not send several samples at the same time. If the well consistently shows acceptable coliform and *E.coli* counts, sample at least three times each year.

How to sample *for bacteria*

The following rules apply to routine sampling for coliforms and *E.coli*. For other tests, follow the sampling rules provided by the testing laboratory.

- use the water sample bottle provided by your testing facility. (The granular material provided in the bottle is sodium thiosulphate and is intended to be there. This material may cause a reaction if ingested or inhaled, therefore bottles should not be handled by young children.)
- do not touch the bottle lip, inside of lid, or inside of bottle – never set the lid down
- do not rinse out the bottle
- select a non-swivel tap – remove aerators and other attachments from your tap
- disinfect the end of the faucet with a chlorine-water mix
- run cold tap water for two or three minutes
- fill the sample bottle to the indicator line directly from the tap without changing the flow of the water (overflowing the bottle risks losing the preservative that comes in the bottle)
- replace the cap tightly and complete the form that came with the bottle
- refrigerate the sample after collection and, if possible, transport it in a cooler
- return the sample and form to the health unit or laboratory within 24 hours of collection

Bacterial contamination

If you get a serious adverse test result – or have any reason to believe your water is dangerously contaminated – take immediate action.

Use bottled water or eliminate harmful bacterial contaminants by sterilizing your water.

Use one, not both, of the following methods to eliminate bacterial contaminants:

Bring water to a rolling boil and then boil it for at least one full minute. (A rolling boil is a vigorous boil that cannot be stopped by stirring the water.) Note that although boiling is an effective method of eliminating bacterial contamination it may actually concentrate other types of contamination such as chemicals, nitrate, metals, and minerals.

– or –

Mix 1.25 mL (1/4 teaspoon) of liquid household chlorine bleach to 4.5 L (1 gallon) of water. Let stand for 30 minutes. There should be a faint chlorine smell to the water. Use fresh unscented chlorine containing 5.25 per cent sodium hypochlorite.

Refrigerate boiled or treated water in clean food-grade containers.

Bottled or sterilized water is safe for drinking. It is also recommended for food washing and preparation (unless the water will be boiled as noted above), brushing teeth, bathing children, and washing dishes. Ontario's health ministry recommends alternative approaches for washing dishes and bathing children.

Untreated well water can be used with caution for baths, showers, and laundry – if you disinfect your hands afterwards.

A well contaminated by bacteria can be disinfected by "shocking" it with chlorine bleach. Shock chlorination involves adding the correct amount of chlorine to the water in the well and leaving it in place for at least 12 hours.

Well disinfection

Shocking is a temporary method of disinfection used to eliminate a one-time case of bacterial contamination. **Shocking should not be used routinely or repeatedly. It is not a substitute for eliminating an ongoing source of contamination or a defect in your well.**

Shocking your well is a relatively complicated exercise that requires care and skill. You may want to engage professional assistance. Public health units are a source of detailed instructions. You need to ensure that:

- the correct amount of bleach is used for your well – using too much or too little can cause problems
- filters are removed
- well water and your entire water distribution system get at least 12 hours contact time with the chlorine
- chlorinated water is properly and safely drained from the system (not into the septic system!)
- well water is not consumed until you have at least three bacteria-free tests conducted at least one week apart.

Exercise care in shocking your well.

Eliminate *the cause*

If you have contaminated water, begin by considering the possible sources of contamination. Reducing or eliminating contaminants at the source is the best place to start.

Next, take a closer look at your well. If your well water continually exceeds drinking water standards for bacteria, there is likely an ongoing source of bacteria affecting your well. Are there defects in the location, construction, or maintenance of your well that could account for the contamination? See the previous sections of this booklet. Address any problems you identify.

If you can't detect the cause of the problem, bring in an MOE-licensed well contractor right away.

You may be able to save yourself a lot of money by hiring an MOE-licensed well contractor to solve the problem instead of buying a home water treatment device. Treatment can be beneficial – it may even be necessary in some circumstances. But treatment should be the final option, after taking steps to reduce contaminants and improve your well.

Treatment *systems*

For bacteria

If your water is contaminated, it is better to remove the source of the contamination than to treat the water. However, if the problem cannot be solved at the source, a number of water disinfection systems are available. Each system requires routine maintenance. Refer to the owner's manual. Regular testing of your water must continue.

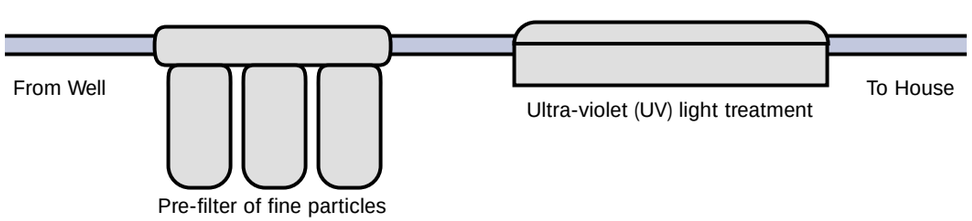
Chlorinators continuously add chlorine to your water distribution system, allowing sufficient contact time for the chlorine to kill the bacteria. These units must be checked often to ensure that the right amount of chlorine is being added.

Ultra-violet (UV) light filters use UV light to kill bacteria, viruses, and intestinal protozoa such as *Cryptosporidium* and *Giardia* in pre-filtered water. A Class A system is required (NSF 55). Pre-filtration of water is generally required for this treatment to work properly. The light needs to be replaced regularly. Drinking water needs to be refrigerated after treatment.

Distillers boil water, then condense the vapour and collect it in another compartment. Bacteria and minerals are removed, and some chemicals. Water should be filtered before treatment and refrigerated afterwards. Standard is NSF 62.

Ozonators inject small amounts of ozone gas into water to kill most bacteria. Treated drinking water should be refrigerated.

Household Water Treatment System



For other contaminants

WARNING: the following treatment systems do not kill bacteria.

Reverse osmosis removes some chemicals – but not bacteria – by passing pre-filtered water through a membrane. This process, which removes inorganic chemicals such as chloride and nitrate, is often used in combination with carbon filters. Reverse osmosis wastes large amounts of water, which could be a concern if water supplies are limited or the septic tank is over-burdened. An option is to use RO only for drinking water.

Activated carbon filters (pitcher style, tap-mounted, or under-sink) can improve taste and odour and remove organic chemicals. Standard is NSF 42. Larger systems, often used as a pre-treatment for reverse osmosis and water softening systems, remove volatile organic compounds. Standard is NSF 53.

WARNING: bacteria can be trapped and multiply in a carbon filter. Regular maintenance is required.

Ion exchange water softeners should remove calcium and magnesium "hardness." Standard is NSF 44.

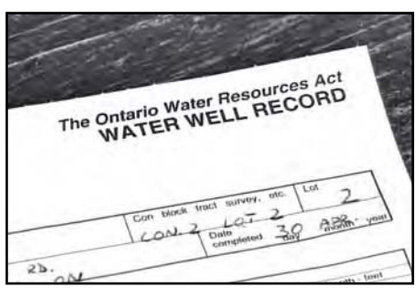
Hiring a contractor

Always hire an MOE-licensed contractor

As set out in Regulation 903, a licensed well contractor or pump installer must be trained and certified according to standards set by the Ontario Ministry of the Environment.

Some tips:

- Ask to see the licence. Confirm that the licence is up to date with the Ontario Ministry of the Environment.
- Get more than one licensed contractor to provide you with advice, a detailed written description of the proposed work (e.g., expected well depth, unit rates, extra services), and an estimate of the total cost.
- Get references and review past work before making a final decision. Ask the licensed contractors the expectations of water quality and quantity in your area and confirm this with your neighbours.
- Get a signed agreement in writing if there are any changes in the work and cost.
- Pay promptly when the work is completed as described in the agreement.
- Contact the Ontario Ground Water Association and/or your Ontario Ministry of the Environment district office if you have any questions or concerns about the qualifications or work procedures of contractors.
- Keep all documents relating to your well, pump, pumping test, and maintenance.



Your *water well* records

Within two weeks of finishing your well, the well contractor must provide you with a copy of your water well record in the format prescribed by the Ministry of the Environment. Each well must have its own well record. Contents include construction details, water yield test results, static water level, and a geological log that describes the soil and/or bedrock conditions and geographic location.

The well record must be updated when the depth of the well is changed or the well is upgraded or plugged and sealed.

If you don't have record(s) for your existing well(s), you can order them from the Ministry for a $20 fee. Call 1-888-396-9355. Well records are entered under the name of the original well owner.

Keep your well records in a safe place, in a file with all papers relating to the well. Make copies to give to contractors. Keep them with test results, invoices and descriptions of work completed, filter and treatment system manuals, service records, and reference materials like this booklet.

Records should be provided to new owners on sale of the property.

Resources

General resources and contacts:

www.wellaware.ca. A portal website for private well owners. Includes an online version of the *Well Aware* booklet and links to further resources.

Ontario Ground Water Association. Membership includes licensed well drillers and pump installers, manufacturers and suppliers, and groundwater scientists and engineers. **See:** www.ogwa.ca.
Contact: (519) 245-7194; fax: (519) 245-7196; ogwa@bellnet.ca

Ontario Ministry of the Environment. Well-related publications are available at: www.ene.gov.on.ca/water.htm. **See:** www.ene.gov.on.ca for links to regional and district MOE offices, and acts and regulations, including Regulation 903.

Green Communities Canada. A national umbrella group for community non-profit organizations that deliver environmental programs and services. Contact Green Communities Canada for bulk orders of the *Well Aware* booklet, and for referrals to participate in local well stewardship activities.
See: www.greencommunitiescanada.org.
Contact: (705) 745-7479; fax: (705) 745-7294; admin@greencommunitiescanada.org.

Resources *continued*

Resources continued on page 28

Well Aware: A Well Owner's Video. A companion to the *Well Aware* booklet, featuring CBC science journalist Bob McDonald. Order from the Ontario Ground Water Association (see above). $17.20 each, includes shipping, handling, and taxes.

Best Management Practices: Water Wells. Agriculture Canada and the Ontario Ministry of Agriculture and Food. Excellent source. Available online at www.ofa.on.ca/subsites/water. **See:** *Best Management Practices: Water Wells.*

Environment Canada factsheets and other resources. **See:** www.ec.gc.ca/water.

Well records. Available for a $20 fee from the Ontario Ministry of the Environment. Call 1-888-396-9355. Well records are entered under the name of the original well owner.

Water testing. Public health units test for bacteria. For the health unit nearest you, look under "Health" in the blue pages of your telephone directory. The Ontario Federation of Agriculture Rural Water Quality Testing Program provides confidential testing for a number of potential contaminants, including pesticides, fuels, minerals, metals, solvents, fuels. Call 1-800-668-3276; or see: www.ofa.on.ca/water.

Water treatment devices. See Health Canada, www.hc-sc.gc.ca. Search for: *Water treatment devices for disinfection of drinking water, Water treatment devices for the removal of taste, odour and chemicals.*

Water quantity and conservation. *Household Guide to Water Efficiency*, Canada Mortgage and Housing Corporation, 2000. Call 1-800-668-2642; or see: www.cmhc-schl.gc.ca. *Managing your water well in times of water shortage*. Ontario Ministry of the Environment. Call 1-800-565-4923; or see: www.ene.gov.on.ca.

Septic systems. *A Guide To Operating and Maintaining Your Septic System*. Available from Ministry of Municipal Affairs and Housing. Call 1-416-585-6666 or download at: www.obc.mah.gov.on.ca/userfiles/HTML/nts_4_7726_1.html. *Septic System Maintenance Pure and Simple*, video, brochure, and posters, Environmental Health Foundation of Canada. **See:** www.ehfc.ca/septic.htm for ordering information.

Agricultural best practices. The Environmental Farm Plan has infosheets and worksheets on topics such as pesticide, fuel, and fertilizer storage, and aspects of nutrient management. **See:** www.gov.on.ca/OMAFRA/english/environment/efp/efp.htm for information on EFP. Scroll down for online infosheets. For more information and dates of EFP workshops in your area, call: Ontario Soil and Crop Improvement Association, 1-800-265-9751.

Water quality testing diary

Date Tested:	Parameters:	Result:
2002-08-04 Sample	minerals / metals / bacteria	normal

Well maintenance diary

Date Completed:	Action:
2002-08-04 Sample	extended casing above ground, landscaped around